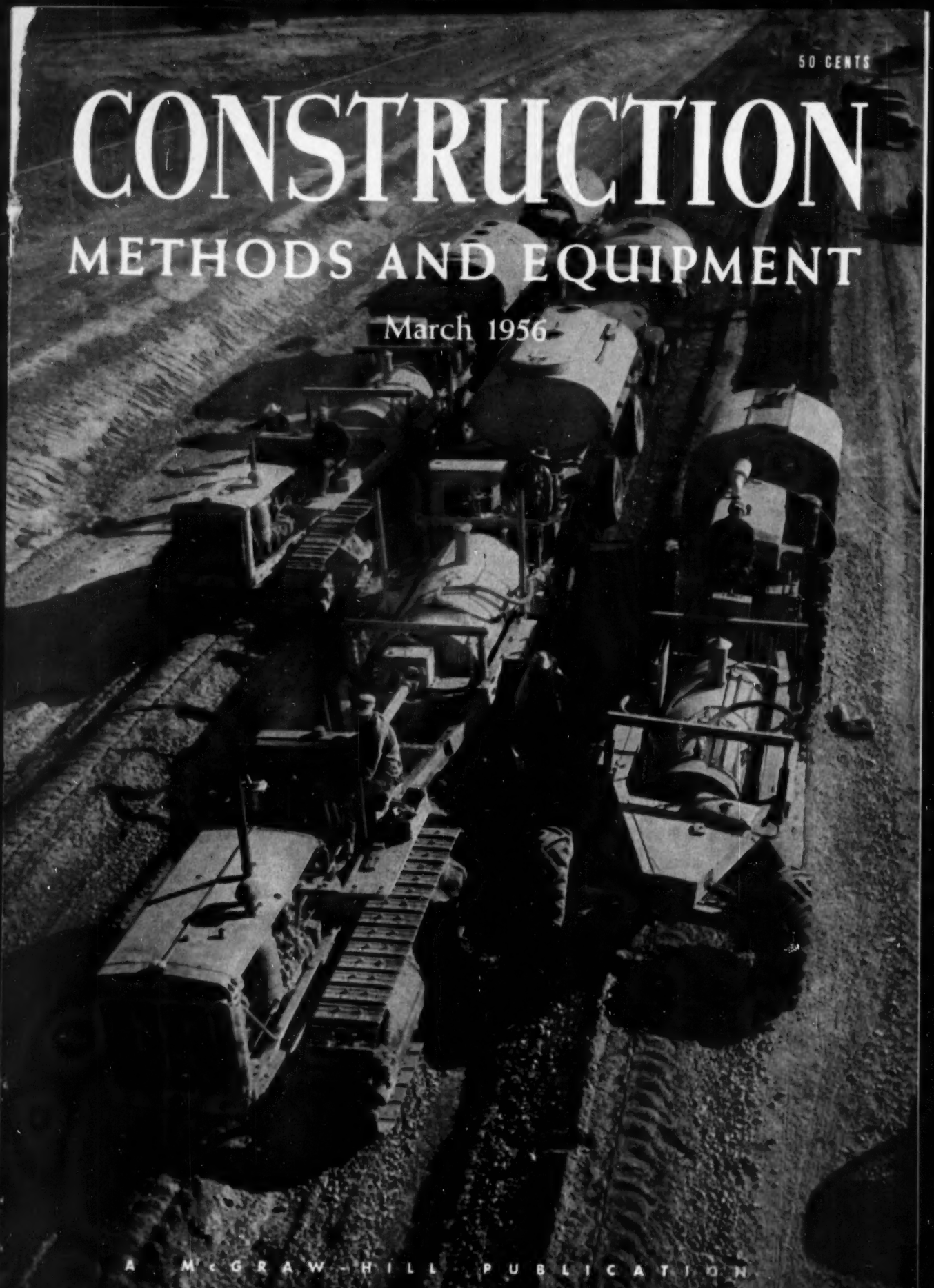
50 CENTS

# CONSTRUCTION METHODS AND EQUIPMENT

March 1956



A McGRAW-HILL PUBLICATION

Belger's 254 Lorain hoists steel with Yellow Strand for a new super market in Mission, Kansas.

Belger Cartage Company, Kansas City, Mo., has 17 cranes, winch trucks, A-frame trucks and a portable hoist machine which they use in custom contracting, subcontracting, commercial rigging, erection and dismantling at greater Kansas City locations. Every one of these machines, including the 254 Lorain shown above, uses nothing but Yellow Strand Wire Rope.

Asked why they've standardized 100% on Yellow Strand, Larry Belger says: "We just think that B&B is more dependable. And the distributor gives us exceptional cooperation in any problem."

Mr. Belger is right. Yellow Strand is dependable, gives wire rope users easy installation, smooth spooling and long life. All wire used in Yellow Strand is drawn to the highest and most rigid specifications. The wire is then laid up into wire rope by modern B&B equipment and thoroughly tested for perfection. The result is a wire rope that combines the perfect balance of strength, hardness, toughness, ductility and ability to withstand bending fatigue . . . a wire rope that gives better performance for a longer period of time.

Mr. Belger is right again when he says B&B Distributors give excellent service. The reason is that these distributors are always near you, maintain accurate records of your particular wire rope needs, and always carry sufficient stock to give you the Yellow Strand you need . . . when you need it.

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**Broderick & Bascom Rope Co.**

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American Logging Tool Corporation is a subsidiary of Broderick & Bascom Rope Co.

# B.F.Goodrich

## All-Nylon Universal tires eliminate impact breaks for rock company

LONG ROCK COMPANY of Princeville, Illinois, has hauled thousands of tons of stone in the past few years from quarry to crusher to road-construction site. Trucks must travel over rock and rough roads—conditions that used to rip and tear tires and run up costs.

Then Long Rock switched to new B. F. Goodrich *all-nylon* Universal tires. "These tires," writes James Long, "have eliminated impact breaks and do a fine job of resisting cuts and abrasions. Our switch to your *all-nylon* Universal tires has saved us down-time and hundreds of dollars annually."

B. F. Goodrich Universal tires give such outstanding service because the tread is specially compounded to resist rock cuts. The *all-nylon* cord body withstands double the impact of ordinary materials, resists heat blowouts and flex breaks. No wonder the *all-nylon* body outwears even the extra-thick tread, *can still be recapped over and over!*

See your B. F. Goodrich retailer today and find out how you can get longer service at lower cost with B. F. Goodrich *all-nylon* Universal tires. Or write *The B. F. Goodrich Co., Tire & Equipment Div., Akron 18, Ohio.*

**Specify B. F. Goodrich tires when ordering new equipment**

**"WE WOULDN'T USE** any tires in our operations that were not of B. F. Goodrich *all-nylon* construction," writes James Long.

**UNITS** of County Concrete, Inc., Newtown, Ohio, roll on such tires as the BFG *all-nylon* All-Purpose. All replacements are BFG.

*Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book*

(Advertisement)

## *Symons* FIELD REPORT...

**Symons Forms, Shores and Column Clamps Used On 525 Ft. Aqueduct at Streator, Illinois...**
to carry a 27-inch pipe across a ravine.

Symons solved the difficult task of setting up to pour concrete around the vitrified tile pipe, averaging 225 pounds per foot. Weight of pipe and poured concrete is over one ton per lineal foot.

Footings 7′ x 7′ and 1′3″ thick were first built for the concrete piers spaced 25 feet apart. Symons Column Clamps were used to form the piers—12″ x 24″ at the base, 12″ x 48″ at the top and range in height from 10 to 19 feet.

The aqueduct is 4′3″ wide and four feet high. Symons Forms with steel cross members and 51-inch ties were used to form the sides, which were supported by one set of walers.

Three-quarter inch plywood formed the beam bottom, resting on 4″ x 4″ joists. Girths 4′ x 6″ were spaced every four feet and supported by Symons Safety Shores. Warren & Pragg, Decatur, Illinois, was the architect and Central Ironite Waterproofing Company, Maywood, Ill., was general contractor.

Symons Forms, Shores and Column Clamps can be rented with purchase option, all rentals to apply on purchase price. Symons Clamp & Mfg. Co., 4255 Diversey Ave., Dept. C6, Chicago 39, Ill.

View showing completed piers and aqueduct

For More Information on
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CONSTRUCTION

Volume 38
Number 3

# METHODS

AND EQUIPMENT

Established 1919

*March 1956*

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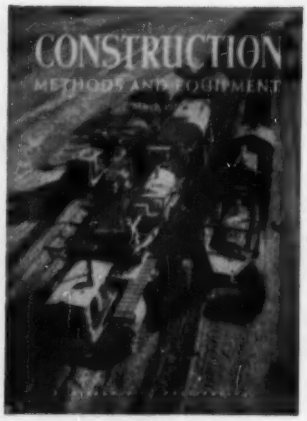


## On the Cover

Three Pettibone-Wood Road-mixers team up for one of the biggest soil cement jobs on record—a 13.5-mi stretch of freeway between Sacramento and Roseville Calif. 469,000 yd of cement-treated base. Baldwin Contracting Co., Roseville, is the general contractor.

**CONCRETE WORK**

Any contractor who does concrete work will find CM&E's series of articles on Concrete Mixing and Placing useful. Reprints are available in booklet form. Single copies are 50¢; for orders of 10 copies or more, the price is 40¢ each. Address your order to the Editor.

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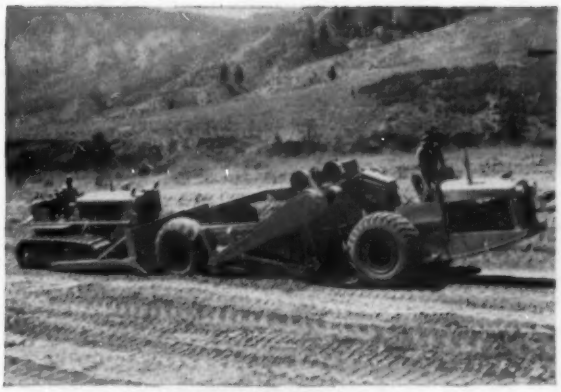

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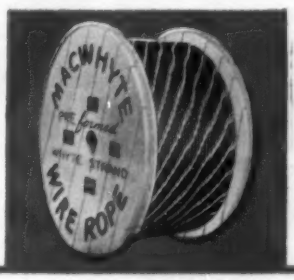

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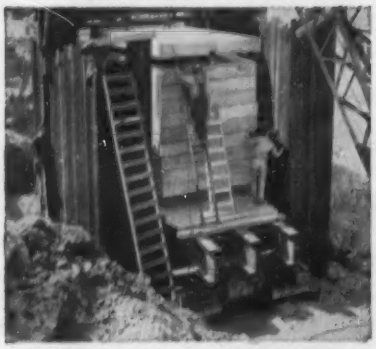

*Checking Foundations with 120-Ton Load on H-Bearing Frames Anchored to Foster Piling*
Hotel - Department Store - Parking Facility
THE DENVER COLORADO PROJECT

Contractors Webb & Knapp got a *Head Start* on this gigantic project by calling Foster for rental steel-sheet Piling, to complete four sumps (that were holding up the major excavation of this 400-foot square foundation). Foster delivered *on time*, the exact sections and exact lengths of steel-sheet Piling needed to get a head start on work schedules.

Foster 12"x 53 lb. H-Bearing Piles driven an average depth of 50 feet, around perimeter of the gigantic 400 foot excavation.

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# Pay Dirt in This Issue

*March, 1956*

**Air Force Specifies Rigid Runway Pavement** . . . . . 52
At AGC's 37th annual convention, Maj. Gen. Washbourne announces decision to build all runways of concrete.

**Fork Lift Truck Subs for Crane** . . . . . 56
By rigging a fork lift truck with detachable steel cables contractor produces an economical crane substitute.

**How to Spin a Suspension Cable** . . . . . 58
A pair of grooved spinning wheels speed past each other every 7½ min to lay a 4,000-ft suspension bridge cable.

**Hydraulic Dredge Places 900,000-yd Road Fill** . . . 64
Cold weather is a constant threat, but contractor's calculated risk is paying off in an economical operation.

**Tunnel Rig Chews Through Shale** . . . . . 78
Huge mining machine advances 26-ft bore at over-all average rate of 3½ ft per hr. It has made 56 ft in 7 hr.

**Reusing Caissons Saves $500,000** . . . . . 104
Ancient concrete caissons are salvaged and converted into dry-land cofferdam and foundation on New York job.

**Paving . . . How to Get the Best Results** . . . . . 117
The seventh article in CM&E's series describes the best methods of hauling, mixing, and testing concrete.

**New Management Methods Can Cut Costs** . . . . . 166
Experts explain at UCLA conference how industrial engineering techniques can boost construction efficiency.

**Do's and Don'ts of Explosives Handling** . . . . . 179
All explosives are dangerous. Only competent users should handle them. Here's a list of common hazards.

**Loader Proves Fast Wrecker** . . . . . 190
Demolition job sends 3-ton front end loader to top of building to help break up an extra-thick roof slab.

Construction News from Washington 7
Job Talk 12
It's Your Business 24
Picture of the Month 37
Construction News in Pictures 41
Construction 'Round the World 46
Editorial 51
Underwater Sweeper Sets Cables 72
Light Beams Eliminate Shores 96
Rail Relocation is Tough Job 101
Twin Pavers Pour Tunnel Invert 159
Preassembling Pipe Cuts Costs 172
McGraw-Hill Editorial 194
Maintenance Shop 197
Contractor-Labor Relations 201
Construction Men in the News 207
Sales and Service 210
Construction Equipment News 216
Methods Memo 268

**NEXT MONTH**

A forest of cranes and derricks dominates the scene at Delaware City, Del., construction site of one of the world's largest refineries. Details on cost saving techniques will be reported next month.

(Advertisement)

## CHARLES RIVER SEEPAGE LICKED BY GORMAN-RUPP PUMPS

Work must go on . . . and does with Gorman-Rupp Self-Priming Centrifugal Pumps on the extensive South Charles River Relief Sewer Project of the Metropolitan District Commission near Boston.

Here Peter Kiewit Sons Company holder of two out of three contracts covering more than four and one half mile of sewer line, is creating modern facilities that will serve Waltham, Newton, Watertown, Brighton, Cambridge and Brookline.

Dewatering Insurance with Gorman-Rupp Pumps in the South Metropolitan Sewerage District in eastern Massachusetts.

Much of the line stretches along the bank of the Charles River and is well below water level. A constant problem in the open cut is seepage—met ably by a battery of Gorman-Rupp Pumps, which pump out the water, drying excavations fast. In the cut is then laid pipe ranging in size from 42-inch diameter on the west end to a 6-foot, 9-inch by 9-foot modified horseshoe sewer on the present eastern location.

Gorman-Rupp Model 36A-JF, on this project, has an A. G. C. rating of 90,000 G. P. H. at 25' TDH.

Contractors on projects of this nature are assured of solid pump performance by a long on-the-job record and the plain language guarantee behind all Gorman-Rupp Contractors' Pumps.

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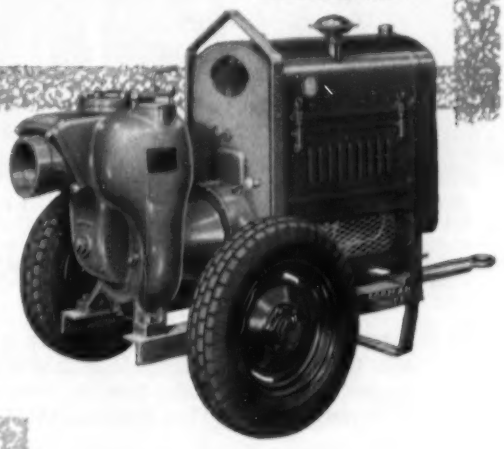
**GORMAN-RUPP PUMP** *Guarantee*

- Our distributors are authorized to put a Gorman-Rupp Contractors' Pump on any pumping job, any time, anywhere, alongside any other make pump, size for size.
- The Gorman-Rupp Pump is guaranteed to pump more dirty water more hours, using less gasoline and to prime quicker than any other self-priming pump.
- If it isn't the best all-around pump, our distributor will accept the return of the Gorman-Rupp Pump and pay the user any installation expense incurred.

**THE GORMAN-RUPP COMPANY**
**Mansfield, Ohio**



Sizes 1½", 2", 3", 4", 6", 8", 10".

Every pump covered by this plain-language guarantee!

Gorman-Rupp PUMPS

**Write for Bulletin No. 8-CP-11**

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*(Advertisement)*

# Movalls Dump All Materials — Here's Proof

**MARINE CLAY**—Dutcher Construction turned to Movalls when gravity-dump wagons couldn't discharge the glue-like clay on his Seaway job; found them ideal, ordered more. Clay came out of scrapers in wheel-blocking lumps. Dozer-type ejector with 140,000-lb. push wipes every load out clean, eliminates buildup. Dutcher frequently uses one load to bulldoze previous loads. He now has 12 Movalls (rated capacity 25 heaped yds., 31 tons) powered by Caterpillar DW21 turbocharged tractors.

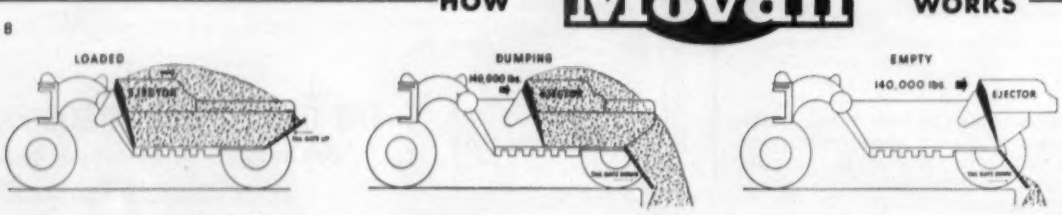
**FROZEN EARTH AND ROCK**—C. A. Pitts, Ltd., operates eight C & D Movalls powered by Cat DW21 tractors on Seaway job near Prescott, Ontario. Movall bodies are built for extra heavy duty, take shock of 6-yd. bucket loads of rock and huge frozen chunks without damage. Big 11′ x 19′ target area and low 8′ height make for easy spotting and fast loading by shovel, dragline or belt loader.

**WET SAND, GRAVEL**—RD15 Movall, for use with Cat DW15 and DW10 tractors, has rated capacity of 16 yds. or 22 tons. Here it's discharging heavy load of wet aggregate into grizzly at controlled rate. Exclusive scraper-in-reverse design enables Movall to dump either standing still or traveling; operator controls action through standard Caterpillar controls.

**ROCK**—Berlanti Construction Co., owns 5 Movalls, says, "Positive ejection enables Movall to handle rock, dirt, or sticky materials. Also we find it very adaptable when interchanging from Movall to scraper operation." Interchangeable yoke speeds changeover, permits Movalls to work behind several different prime movers.

**SEE FOR YOURSELF. Ask your Caterpillar-C & D dealer NOW for a buy-and-try demonstration... or write C & D Division, Yuba Manufacturing Company, Perkins (suburb of Sacramento), Calif. Phone: GLadstone 5-8592.**

## HOW C&D Movall WORKS



# Construction News from Washington . . .

**Washington, D.C.**
**March, 1956**

## Airport contracts to benefit from federal grants

Airport construction contracts—ranging from $10,000 to several million dollars each—are coming up for bids this Spring. Total new airport projects will add up to about $120 million—based on $60 million of federal grants which must be matched by the states dollar-for-dollar.

Construction includes grading, drainage, paving, utilities, and all kinds of buildings except hangars. Hangars can't be built with federal aid money.

The increasing flow of construction money to airports will continue. Under the commitment Congress made last year, there's some $180 million of federal funds to be parceled out over the next three years. This—with the matching funds—means at least $120 million of such construction per year.

## Quicker contracts for emergency work

New Corps of Engineer disaster setup means local contractors will get firm contracts more quickly on disaster recovery jobs.

This is a major result of the government's success in letting the Engineers be the responsible agency for recovery operations in the New England and Pennsylvania floods.

The Engineers found contractors were ready to go to work without firm contracts on such things as removal of debris, hazardous buildings, emergency bridges and roadways, power and water supplies, in fact all public facilities. (Federal money pays for this emergency work—but not for permanent rebuilding.)

Next time the Engineers are called on, they will have a disaster recovery organization in all 10 divisions and 41 districts empowered to move into a disaster situation and execute firm contracts with construction firms to get emergency work under way.

## Outlook for more reclamation construction

The long-range outlook is for more spending on reclamation projects in the West, not less. There's been much talk that the Eisenhower Administration, by its very nature, might hold down future growth of such big federal activities as the Bureau of Reclamation.

But Administration officials from Pres. Eisenhower on down talk exactly to the contrary every time they have a chance. Further, they have put themselves solidly behind such big new starts as the $700 to $900 million Upper Colorado Storage Project and the $156 million Frying-Pan-Arkansas trans-mountain water diversion scheme, just to name two.

*Continued on next page*

Regardless of the fate of individual projects, you can look for construction spending on reclamation to boom from the current rate of $130 million per year to a level of $200 million within a few years.

A wide variety of construction work is involved. During the current six months, contracts will be let for three dams—two in California and one in Oregon; Helena Valley Reservoir in Montana; Trinity Dam tunnel in California; diversion works at Slaterville, Utah; two siphons in Oregon; two pipelines in Utah; pumping plants in Utah, Washington, California, Idaho, and Oregon; four power transmission lines—one each for Wyoming and Nebraska and two for the Dakotas; five power substation jobs—two in North Dakota and one each in Wyoming, Nebraska, and California.

## Lease-purchase business picks up

Construction of buildings under the government's lease-purchase program is building up.

More than 50 buildings with a total cost of $120 million already have been approved by Congress and are being designed by architect-engineer firms. Builder-investor bids are to be asked this Spring for at least seven. And bids will be asked on 50 or so by the end of the year.

An additional 85 to 105 projects, totaling nearly $300 million will be presented to Congressional Public Works Committees this year. This new batch of projects includes about $250 million of buildings to be handled by General Services Administration. The balance will be Post Office buildings, handled by the Post Office Department.

Post Office Department's long-lease program—which is similar to lease-purchase—in three years has generated over $50 million worth of construction. O. A. Kieb, Assistant Postmaster-General,, hopes to step up this program to two contracts a day, equal to about $50 million of new construction per year, by the end of the year.

## Fight looms over wage-hour on new highways

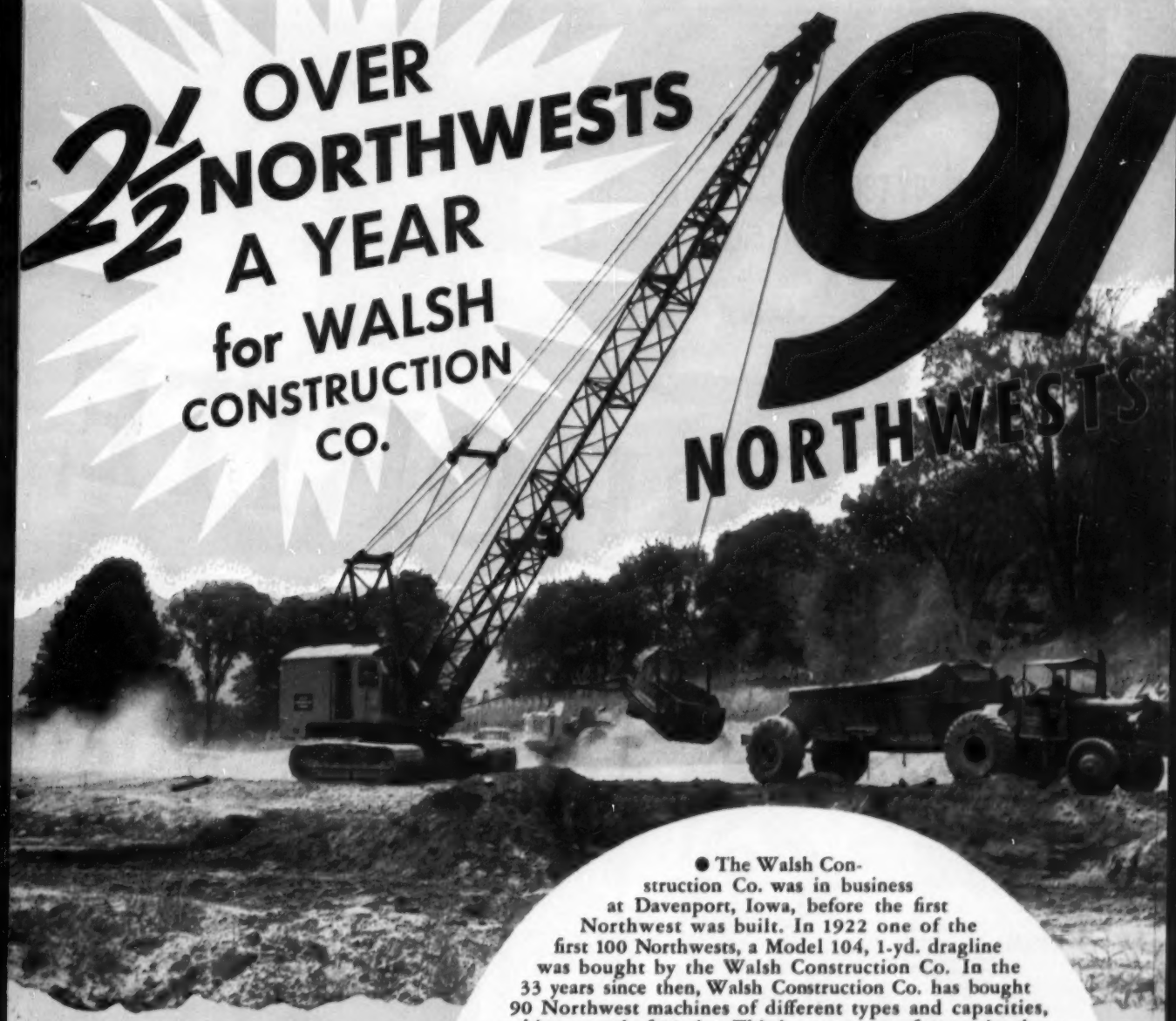
One of the big fights that could block passage of a new multi-billion dollar highway program is the drive by the construction trades to get Congress to apply Davis-Bacon wage-hour regulations to the proposed new federal air program.

Up to now, only state rules have applied. Davis-Bacon's provision for paying "prevailing wages" as determined by the Labor Department, aren't effective now on highways built in part with federal money.

Labor unions campaigning for application of Davis-Bacon, may have hurt their cause, Congressmen say, by writing each member of Congress demanding protection from highway contractors who "exploit" them. Congressional committees are gathering the easy-to-find facts on wages actually being paid on such work.

# 2½ OVER NORTHWESTS A YEAR for WALSH CONSTRUCTION CO.

# 91 NORTHWESTS



● The Walsh Construction Co. was in business at Davenport, Iowa, before the first Northwest was built. In 1922 one of the first 100 Northwests, a Model 104, 1-yd. dragline was bought by the Walsh Construction Co. In the 33 years since then, Walsh Construction Co. has bought 90 Northwest machines of different types and capacities, making a total of 91 rigs. This is an average of not quite three Northwests a year for 33 years.

The Walsh Construction Co. has become one of the world's great contracting organizations. They have reached this position by, among other things, buying dependable money-making equipment. They can own any make of machine they want and they do own other makes of machines—but they have bought nearly 3 Northwests a year for 33 years. Obviously, Northwest Shovels, Cranes, Draglines and Pullshovels must have delivered a *plus service* that made this long continued relationship possible.

You want that *plus service!* It's the service that makes money. It's the reason why one out of every three Northwests sold is a repeat order in the hands of contractors everywhere.

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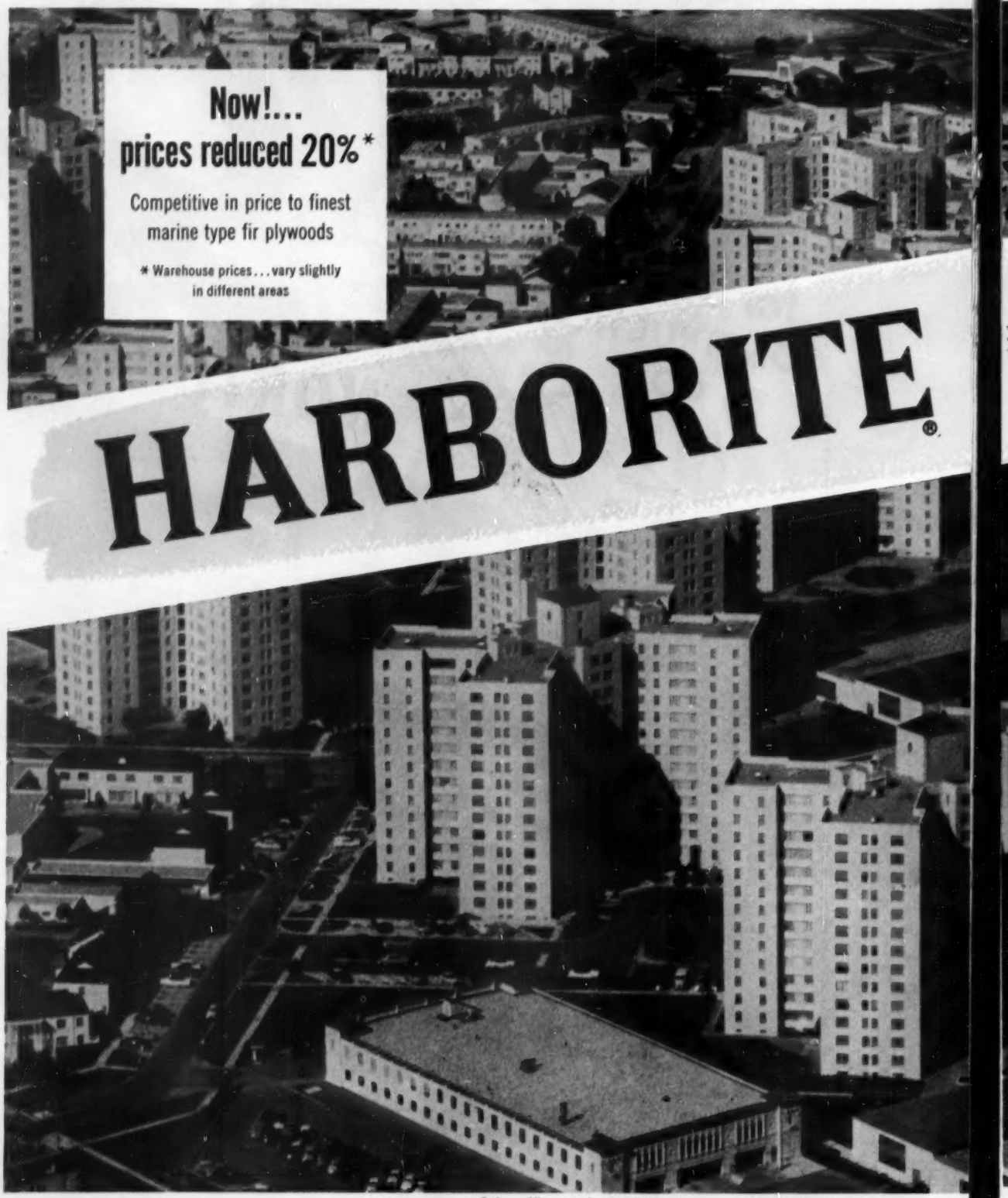
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**Less Stripping Time**
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# *Job Talk . . .*

## How to Make A Primer

A NEW PAMPHLET distributed by Atlas Powder Co. gives some good hints on making primers with either cap and fuse or electric caps.

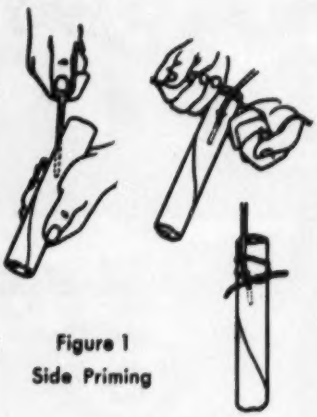


Figure 1
Side Priming

### Cap and Fuse

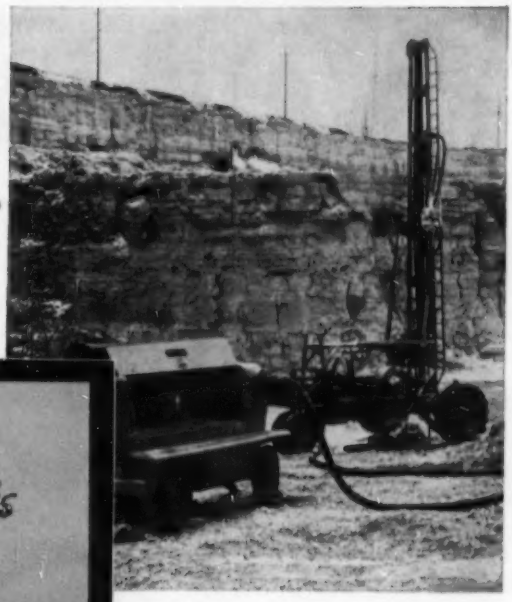
The proper length of fuse should be cut from the roll and the blasting cap crimped to the fresh cut end of the fuse with a cap crimper, not with a knife or with the teeth. Be sure that the fuse is cut squarely across and that the end is pushed gently against the explosive material in the blasting cap. Do not twist the fuse inside the cap. The crimp in the blasting cap should be made near the end through which the fuse enters. In wet work, use a waterproof crimp or waterproof the joint between the fuse and cap.

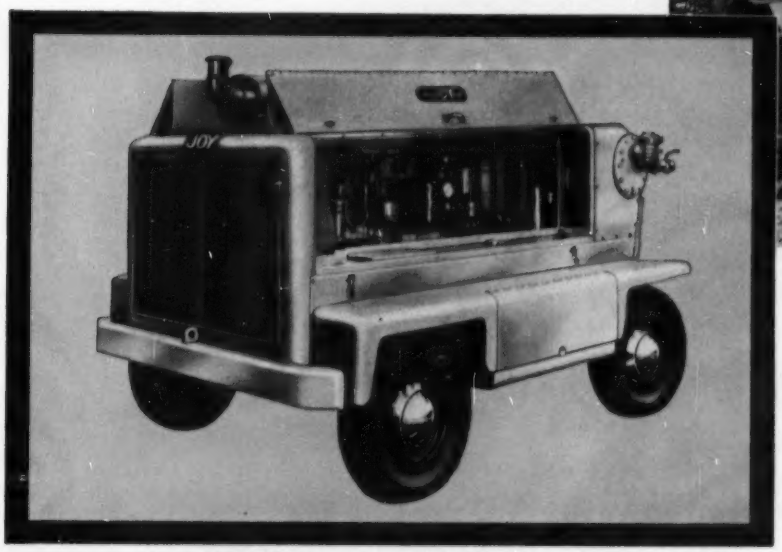
In making up primers by the side priming method shown in Fig 1, punch a hole about the size of a lead pencil in the side of the cartridge. This hole should be a little deeper than the length of the blasting cap and should be directed downward as shown rather than across the cartridge. Insert the blasting cap and fasten the fuse securely to the dynamite cartridge to prevent the cap and fuse being pulled out of the cartridge.

In using the lacing method shown in Fig 2 it is necessary to

*(Continued on page 20)*

# Not only NEW but DIFFERENT



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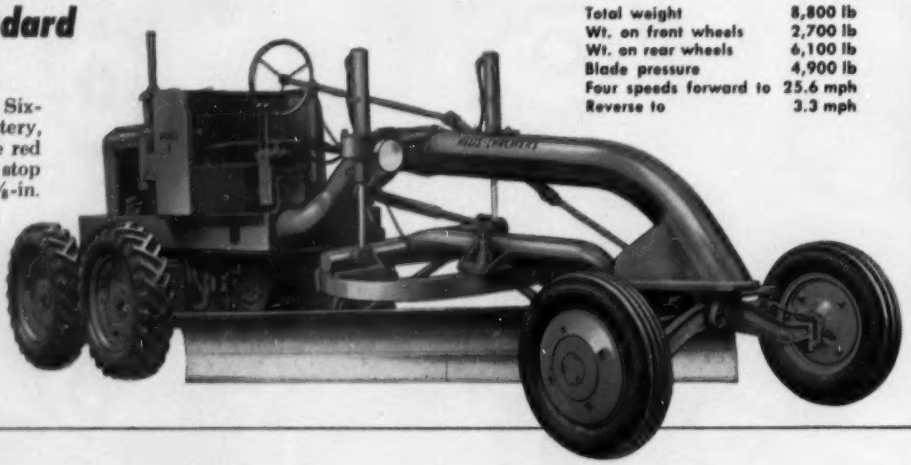
## Model D *Standard*

**(GASOLINE ENGINE)**

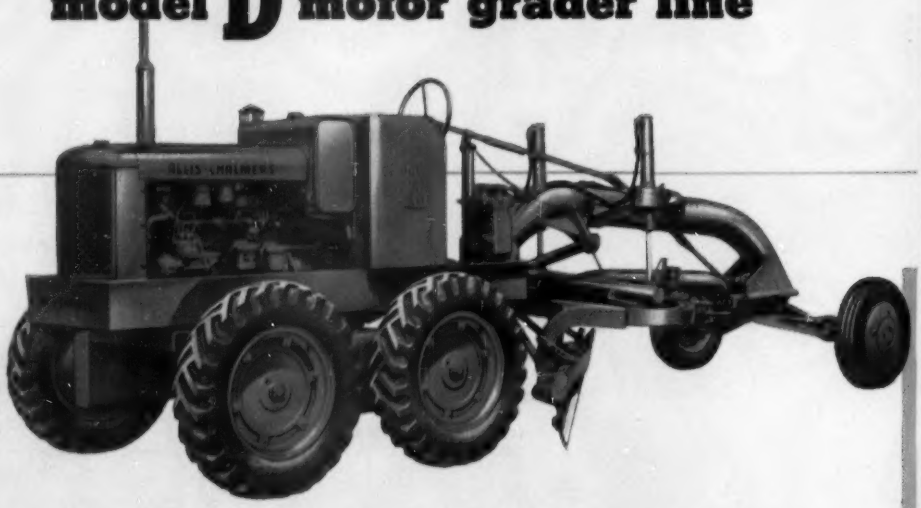
**Standard Equipment:** Six-volt electric generator, battery, two white headlights, one red combination rear and stop light, muffler, 10-ft by ⅝-in. moldboard, hydraulic controls for moldboard lift, four 7.50-20 (6 ply) rear and two 6.50-16 (6 ply) front pneumatic tires with regular tubes.

| | |
|---|---|
| Total weight | 8,800 lb |
| Wt. on front wheels | 2,700 lb |
| Wt. on rear wheels | 6,100 lb |
| Blade pressure | 4,900 lb |
| Four speeds forward to | 25.6 mph |
| Reverse to | 3.3 mph |



# *Match your grading needs with*

## from the Allis-Chalmers model D motor grader line



## Model D Diesel *Standard*

| | |
|---|---|
| Total weight | 9,350 lb |
| Wt. on front wheels | 2,760 lb |
| Wt. on rear wheels | 6,590 lb |
| Blade pressure | 4,900 lb |
| Four speeds forward to | 25.2 mph |
| Reverse to | 3.2 mph |

**Standard Equipment:** Twelve-volt electric generator, battery, two white headlights, one red combination rear and stop light, muffler, 10-ft by ⅝-in. moldboard, hydraulic controls for moldboard lift, four 7.50-20 (6 ply) rear and two 6.50-16 (6 ply) front pneumatic tires with regular tubes.

Both gasoline and diesel Model D's are available with any combination of accessories.

**You can still buy a Model D for one-third the cost of a large motor grader, and it's the most popular, most versatile small grader on the market. In addition to the units illustrated, the Model D is available with other combinations of accessories . . . or with any of these useful attachments: rear-mounted ⅝-cu-yd loader; shoulder maintainer; one-pass windrow eliminator; V or blade-type snowplows. Ask your nearby Allis-Chalmers dealer for a demonstration . . . and prove the Model D's value to yourself.**

| | | | |
|---|---|---|---|
| Total weight | 10,900 lb | Scarifier pressure | 4,900 lb |
| Wt. on front wheels | 3,750 lb | Four speeds forward to | 25.6 mph |
| Wt. on rear wheels | 7,150 lb | Reverse to | 3.3 mph |
| Blade pressure | 6,450 lb | | |

**Fully Equipped as Follows:** Six-volt electric generator, battery, two white headlights, one red combination rear and stop light, muffler, 10-ft by ⅝-in. hydraulically shiftable moldboard, 6-valve control group, four 8.25-20 (6 ply) rear and two 8.25-20 (6 ply) front pneumatic tires with regular tubes, front wheel lean, power circle turn, hydraulic scarifier, all-steel cab.

## Model D *Special*

(GASOLINE ENGINE)

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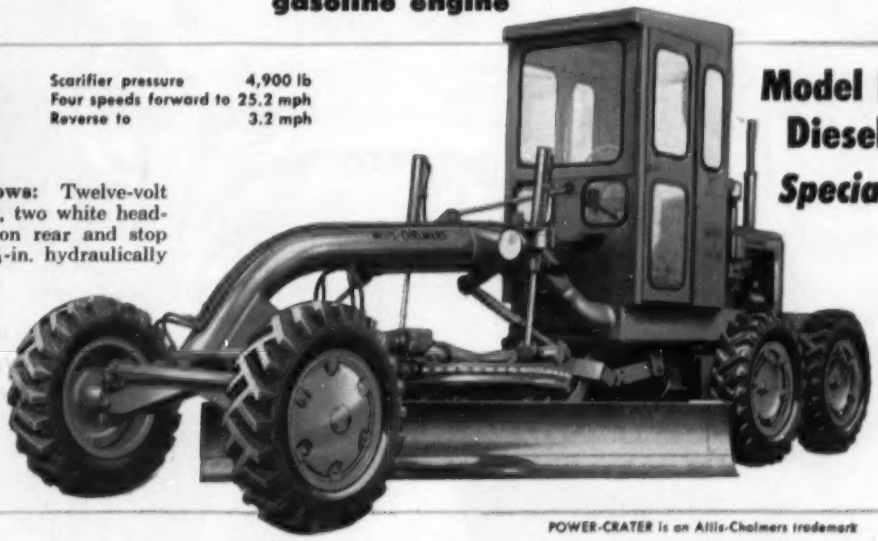
**50-hp POWER-CRATER gasoline engine**

**50-hp diesel engine with follow-through combustion**

| | | | |
|---|---|---|---|
| Total weight | 11,450 lb | Scarifier pressure | 4,900 lb |
| Wt. on front wheels | 3,750 lb | Four speeds forward to | 25.2 mph |
| Wt. on rear wheels | 7,700 lb | Reverse to | 3.2 mph |
| Blade pressure | 6,450 lb | | |

**Fully Equipped as Follows:** Twelve-volt electric generator, battery, two white headlights, one red combination rear and stop light, muffler, 10-ft by ⅝-in. hydraulically shiftable moldboard, 6-valve control group, four 8.25-20 (6 ply) rear and two 8.25-20 (6 ply) front pneumatic tires with regular tubes, front wheel lean, power circle turn, hydraulic scarifier, all-steel cab.



## Model D Diesel *Special*

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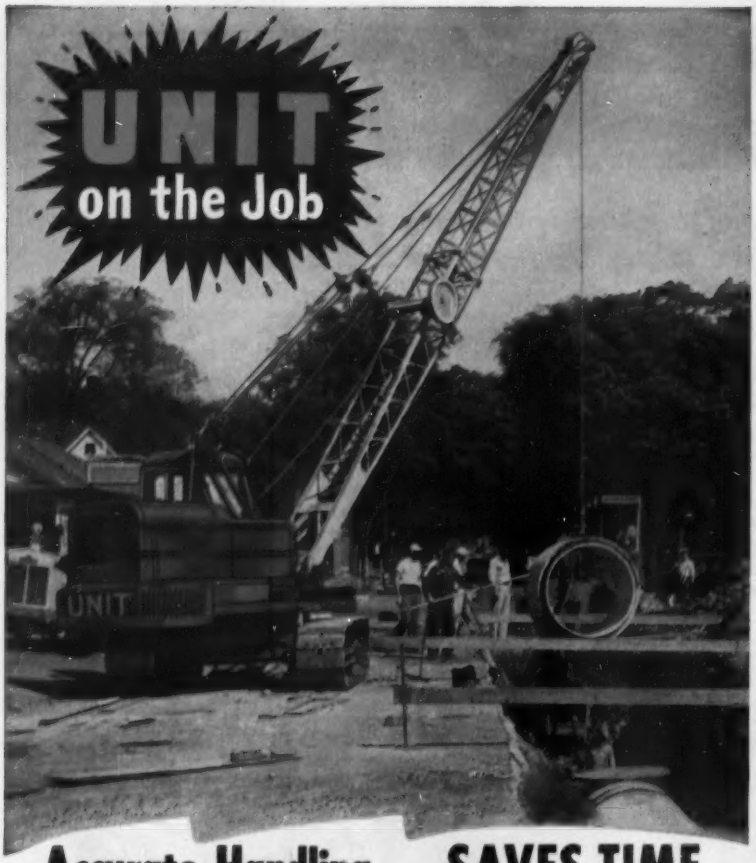


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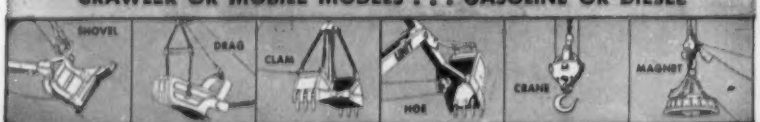


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**JOB TALK...**
Continued from page 12

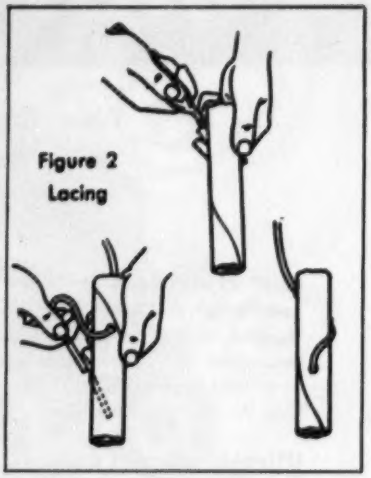

Figure 2
Lacing

punch two diagonal holes as shown. The upper one goes completely through the cartridge and the lower one a little deeper than the length of the cap. The capped fuse is then threaded through the cartridge and the lower one a little deeper than the length of the cap. The capped fuse is then threaded through the upper hole and the cap inserted to the bottom of the lower hole. Care should be taken to avoid sharp bends or kinks in the fuse.

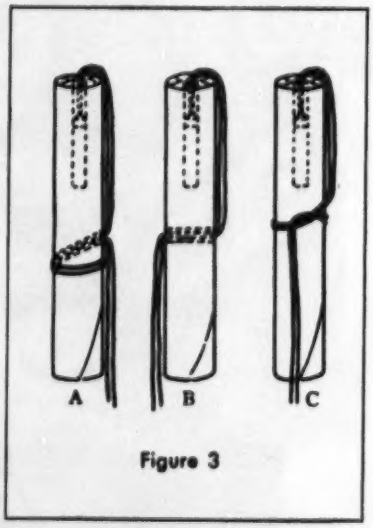


Figure 3

### Electric Blasting Caps

Three methods are shown in Fig 3 for cartridges less than 2 in. in dia.

(A) Punch the hole diagonally through the cartridge below the center. Fold over the wires about 6 in. from the cap to form a

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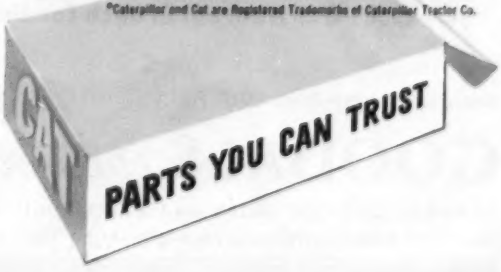

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sharp bend. Then push the folded wires through the hole. Open the folded wires and pass the loop over the near end of the cartridge. Punch another hole straight into the opposite end of the cartridge, insert the electric blasting cap in this hole and take up all slack in the wires.

(B) Punch one hole horizontally through the cartridge at or slightly below the center and another straight into the far end. Push the cap first through the horizontal hole, then into the other hole, and take up the slack in the wires.

(C) Punch a hole straight into one end of the cartridge. Insert the cap into the hole, and half-hitch the wires around the center of the cartridge. Do not hitch the wires too tightly as the strain may break them or injure the insulation.

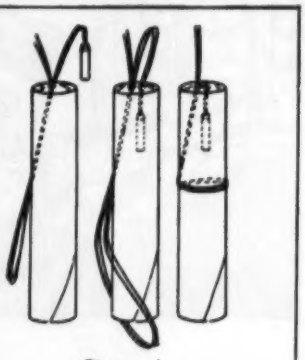

**Figure 4**

When electric blasting caps are used for priming cartridges over 2 in. in dia, punch a slanting hole from the center of one end of the cartridge coming out through the side about 2 or more inches from the end. Fold over the wires about 12 in. from the electric blasting cap to form a sharp bend. Then push the folded wires through the hole, starting at the end of the cartridge and coming out through the side. Open the folded wires and pass the loop over the other end of the cartridge. Punch another hole straight into the end of the cartridge beside the first, insert electric blasting cap in this hole and take up all slack in the wires, as illustrated in Fig 4.

When delay electric blasting caps are used, the cartridge should be punched deeper to take care of the longer shell. Otherwise the priming process is the same as with electric blasting caps.

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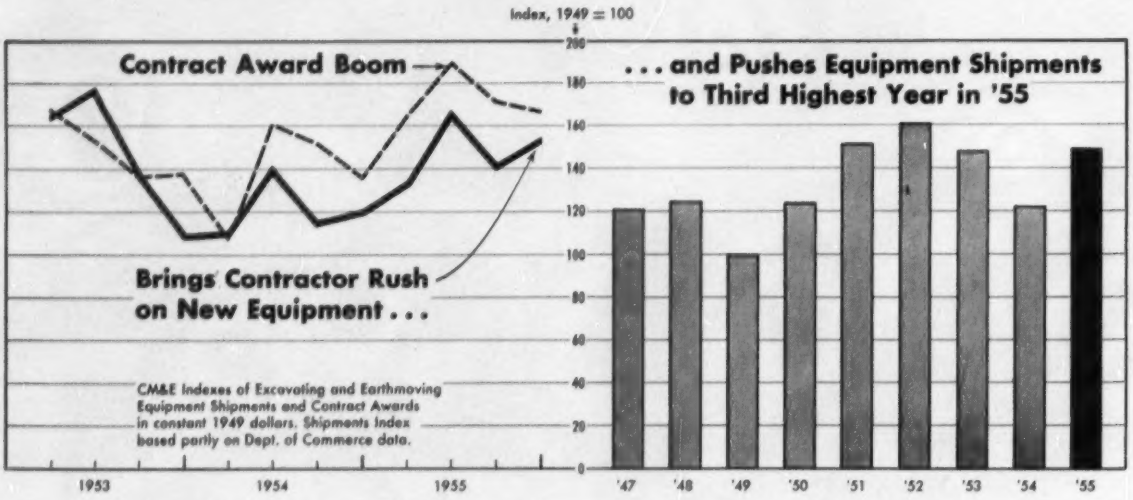
# *It's Your Business . . .*




## Logjam of Orders Causes . . .

## Slow Deliveries, Shortages of Heavy Construction Equipment

THE BOOM in contractor new business during 1955 brought a stampede for new equipment. Many manufacturers of heavy construction machinery were swamped by a flood of new orders. Though they pushed production hard, the tremendous wave of demand caught them unprepared to handle orders on normal delivery schedules. Deliveries began to slow up for some types of equipment as early as the first quarter of 1955, and this situation worsened as the months rolled by. Now reports of slow deliveries are widespread, and supplies are short in many cities for items normally stocked.

Contractors can expect the tight supplies and slow deliveries to continue for at least a few more months. Of course, the picture varies greatly for types of equipment and by manufacturers, and the situation is better in some cities than others. However, in 15 of 21 cities checked by CM&E in February deliveries are slower than normal and stocks are short for some types of rigs. Contractors can best protect themselves against late deliveries by ordering new equipment well in advance.

Among the manufacturers whose deliveries to distributors have

## Equipment Distributor Stocks and Deliveries — February '56

Key—Deliveries: S = Slower than normal N = Normal I = Immediate Delivery time on new orders shown in weeks
Stocks: S = Shortage N = Normal A = Adequate

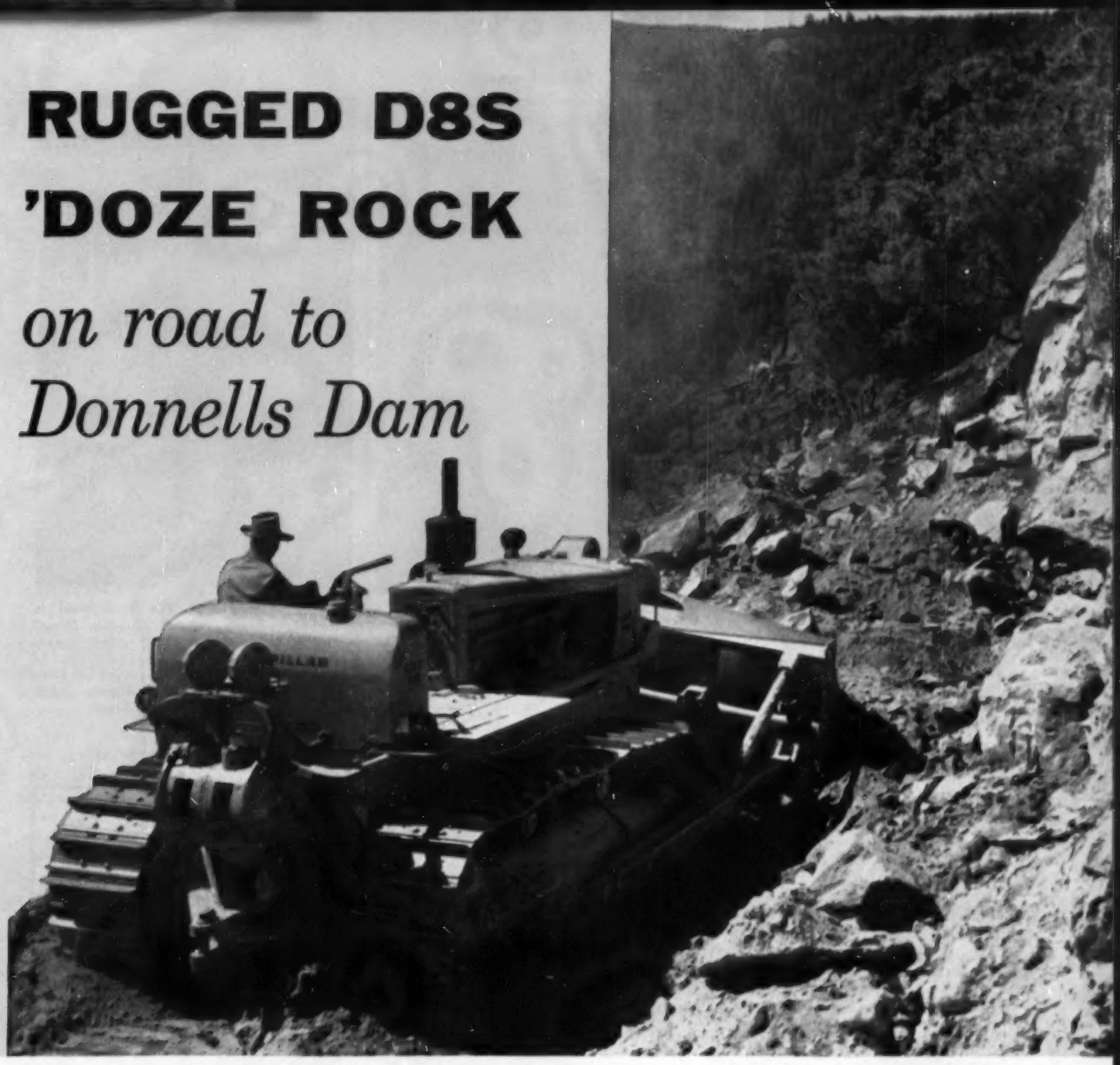
| Type of Equipment / City | Atlanta Stk | Atlanta Del | Baltimore Stk | Baltimore Del | Birmingham Stk | Birmingham Del | Boston Stk | Boston Del | Chicago Stk | Chicago Del | Cincinnati Stk | Cincinnati Del | Cleveland Stk | Cleveland Del | Dallas Stk | Dallas Del | Denver Stk | Denver Del | Detroit Stk | Detroit Del | Kansas City Stk | Kansas City Del |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tractor, diesel | A | N 2 | N | N 2-4 | S | N 4-16 | A-S | N-S | A-S | S 4 | A | N 3-4 | A | N 2-3 | A | N 6 | N | N | A-S | S 3-4 | A | N |
| Tractor with cable scraper | A | N 2 | N | N 2-4 | S | N 4-16 | S | S | A-S | S 4 | A | N 4 | A | N 10 | A | N 6 | N | N | A-S | S 3-4 | A | N |
| Scraper without power unit | A | N 2 | N | N 2-4 | S | N 4-16 | A | N | S | S 2-4 | S | N 4 | A | N 10 | A | N 6 | N | N | A-S | S 3-4 | A | N |
| Crane, crawler | A | N 2 | A-N | N 3-6 | S | N 4-16 | S | S | N | N | N | N 4 | A | N 2-12 | A | N 3-26 | N | N | A-S | S 3-4 | A | N |
| Crane, truck mounted | A | N 2 | A-N | N 3-8 | S | N 4-16 | S | S | N | N | N | N 4-8 | A | N 8 | A | N 6 | S | N | A-S | S 3-4 | A | N |
| Power shovel, crawler | A | N 2 | A-N | N 3-4 | S | N 4-16 | A-S | S | N | N | N | N 4 | A | N 8 | A | N 6 | S | N | A-S | S 3-4 | A | N |
| Dragline, crawler | A | N 2 | A-N | N 3-4 | S | N 4-16 | A | I | N | N | A | N 4 | A | N 6 | A | N 6 | S | N | A-S | S 3-4 | A | N |
| Motor grader | A | N 2 | A | N 1 | S | N 4-16 | A | I | A | N-1 | A | N 1-2 | A | N 2-3 | A | N 2 | S | N | A-S | S 3-4 | A | N |
| Truck, off-highway | A | N 2 | ... | .... | A | N 4 | N | S 12-24 | S | S 2-4 | S | S 12-26 | A | N 2-3 | A | N 6 | S | N | A-S | S 3-4 | A | N |

| Type of Equipment / City | Los Angeles Stk | Los Angeles Del | Minneapolis Stk | Minneapolis Del | New York Stk | New York Del | Philadelphia Stk | Philadelphia Del | Pittsburgh Stk | Pittsburgh Del | St. Louis Stk | St. Louis Del | San Francisco Stk | San Francisco Del | Seattle Stk | Seattle Del | Montreal Stk | Montreal Del | Toronto Stk | Toronto Del |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tractor, diesel | S* | S 2 | S | S 12 | A-N | N-S 8-12 | N | S to 16 | A | S 18 | S | N 4-17 | A | S 90 | A | S 4-8 | A | N 3 | S | S to 12 |
| Tractor with cable scraper | S* | S 2 | A | S 12 | A-N | S 4-12 | N | S to 16 | N | # | A-S | N-S 8-12 | A | S 90 | A | S 4-8 | A | N 3 | S | S to 16 |
| Scraper without power unit | S* | S 2 | A | I | A-N | N-S 2-8 | N | N 4-8 | N | S 12 | A | N 2-4 | A | S 90 | A | N 2-3 | A | N 3 | A | N 1-2 |
| Crane, crawler | S* | S 2 | S | N 2-4 | N† | N-S 1-8 | S | S 12-36 | A | S 8 | A | N 5-12 | S† | S† 24-32 | S | S 8-16 | A | N 10 | A-S | N-S to 24 |
| Crane, truck mounted | S* | S 2 | S-N | N 3 | N† | N-S 2-8 | A | N 8-12 | A | S 8 | A | N 5-12 | S† | S† 24-32 | S | S 12-16 | A | N 10 | S | S to 12 |
| Power shovel, crawler | A | S 2 | S | N | N† | N-S 1-32 | S | S 12-36 | A | S 8 | A | N 5-12 | S† | S† 24-32 | S | S 12-16 | A | N 3 | A-S | N-S to 26 |
| Dragline, crawler | A | S 2 | A-N | N 4 | N | S 6-12 | S | S 12-36 | A | S 8 | A | N 5-12 | S† | S† 24-32 | S | S 12-16 | A | N 2 | A-S | N-S to 26 |
| Motor grader | A | S 2 | S | S 8 | N† | S† 18 | A | S to 12 | A | S 8 | A | N 1-8 | A | S 12 | S | S 12-16 | A | N 3 | A | S to 16 |
| Truck, off-highway | A | N | A | S | A | N 8 | A | N 4-8 | A | N | S | S to 16 | N | S 8-12 | N | S 16 | A | N 3 | A | S to 12 |

* Shortages not serious # Cannot order † Large size

# RUGGED D8S 'DOZE ROCK

## *on road to Donnells Dam*



In rough mountain country above Strawberry, California, Tri-Dam Constructors are preparing for the $32,000,000 job of building Donnells Dam.

One of the first requirements is an 8-mile, 24-foot contour road leading up to the dam site and permanent camp. And most of the roadway has to be blasted out of steep granite slopes like the one pictured. Handling shot rock on locations like this takes tough equipment. That's why Tri-Dam is using CAT* D8 Tractors with No. 8S Bulldozers. There are 9 of them working on the project.

The D8 has been known as "king of the crawlers" for years. As jobs grew bigger and tougher, the tractor has grown with them. Today's D8 is new from the ground up—bigger, tougher, more powerful than any earlier model. Look at these features:

- *New heavy-duty 4-cycle diesel engine delivering 191 HP at 1200 RPM.*
- *Choice of torque converter or direct drive.*
- *Oil clutch, for smooth performance and long work life.*
- *New 7-roller track frame and long-wearing "water quenched" track shoes.*
- *New, more powerful starting engine with "in-seat" starting.*
- *Better job visibility and greater operator comfort.*

Your Caterpillar Dealer will be glad to show you how this new D8 can increase your production. And you can depend on him for prompt service and original parts. Ask him for a demonstration today.

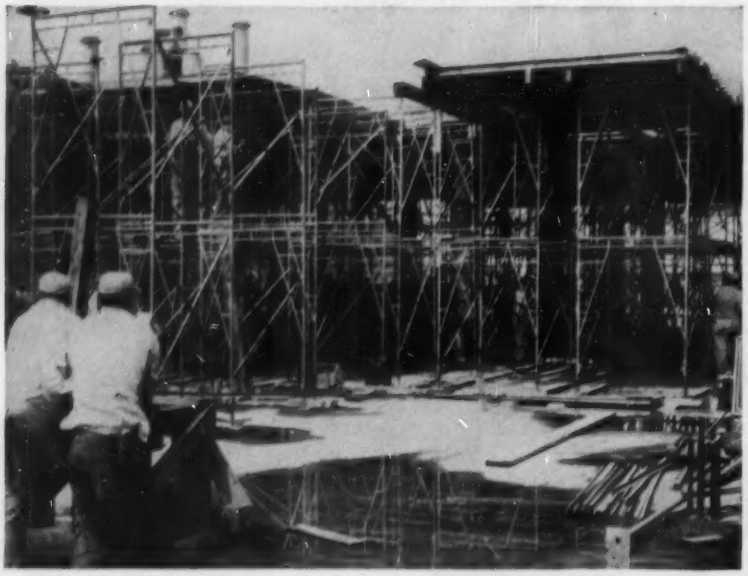
Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

**CATERPILLAR***

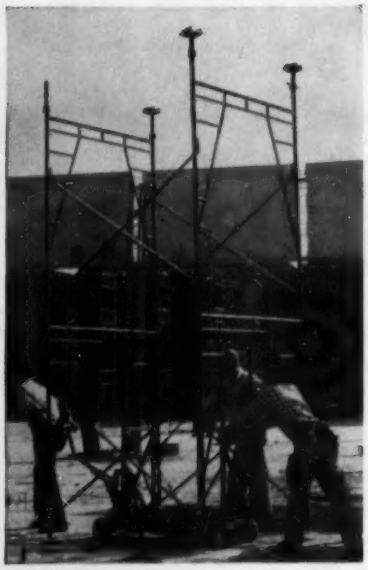
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**NAME THE DATE... YOUR DEALER WILL DEMONSTRATE**

(Advertisement)



THIS UNIQUE SYSTEM of moving complete sections of shoring to new pour areas is used by Wigton-Abbott Corp., Plainfield, N. J., to eliminate the job of disassembling and reassembling the shoring. Eleven "Trouble Saver" Sectional Shoring units, each covering 720 sq. ft., are pulled on wood sills by a hand winch. Each unit was slid three times for succeeding concrete pours during construction of the 189' x 231' Monsanto Chemical Co. warehouse, Kearney, N. J. Form work was "permanently" placed on those sections between drop heads.



WHEELED HYDRAULIC dolly is used to move four-frame unit of "Trouble Saver" Shoring to next pour. This system speeds operation for William J. Moran Co. on Emporium-Capwell Co. warehouse covering a city block in Oakland, California. 3,600 frames were used on this building.

# Good Planning Cuts Shoring Costs

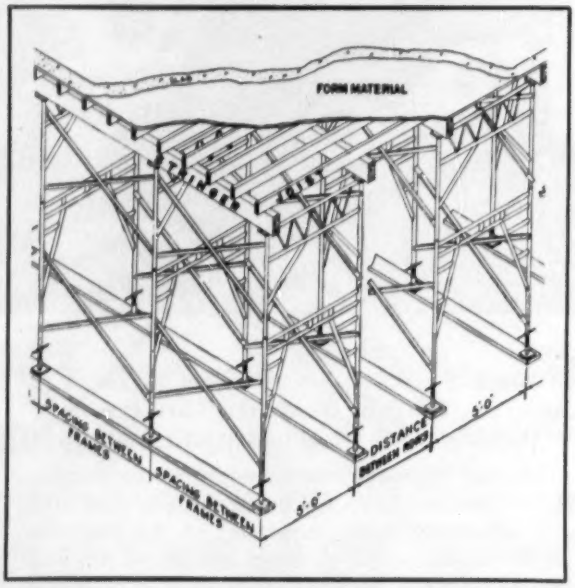
ONE OF THE MOST IMPORTANT advantages of modern sectional steel shoring is the fact that it can be planned on the drawing board. Load bearing strength can be accurately calculated, the number of units pre-determined and the whole installation laid out to assure greatest efficiency on the job.

It is during this planning period that the engineering ability, experience and imagination of The Patent Scaffolding Co. Inc., pays dividends to the contractor. For when a shoring installation is properly laid out on the drawing board, a lot of time, money and trouble are saved on the job.

First, PS Co. helps the contractor select the right kind of shoring by carefully studying the character of the job. Contractors planning with PS Co. have a choice of three types of steel shoring: "Trouble Saver"® Sectional, "TubeLox"® tube and coupler type Shoring and Burton's single post Shores. Once selected, the shoring is laid out to carry the desired loads with an adequate factor of safety and also to get maximum re-use from the number of units needed. Unique methods of rolling, sliding and lifting entire sections of sectional shoring from one pour area to another are often worked out at this stage too.

The complete story on PS Co. Shoring can be found in Bulletin PSS-33 "Modern Shoring for Concrete Construction". It's available at no obligation from the Patent Scaffolding Co., Inc.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.




SAFE WORKING LOADS for "Trouble Saver" Sectional Steel Shoring vary according to spacing between 5'-wide frames, distance between rows, and position of stringers on frames. This prefabricated, engineered shoring will handle the heaviest loads and provides a clean, neat installation. It is easily adaptable to all types of construction: flat slab, slab with drop head, pan joist, poured arch and beam.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street Dept. CM&E Long Island City 1, N. Y.
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Branches in all principal cities
In Canada: 355 Dufferin St., Toronto

## IT'S YOUR BUSINESS . . .

Continued from page 24

fallen behind normal schedules are Thew Shovel, Huber-Warco, Marion Shovel, Euclid, Gar Wood, Northwest, Caterpillar Tractor, Link Belt Speeder, and the Adams Division of LeTourneau-Westinghouse. Normal deliveries are reported by Insley, Allis-Chalmers, Koehring, Schield Bantam, and LeTourneau-Westinghouse. International Harvester tractors are generally on normal deliveries but some types are coming through slower than usual.

Euclid's deliveries of heavy duty off-highway trucks take 12 to 16 weeks, and rubber-tired motor scrapers are coming through on three to 12-week schedules. Gar Wood blames a slowdown in component parts for its deliveries running two to three weeks behind on cranes, shovels and draglines. Northwest shipments have slowed down and are now 8-36 weeks for cranes and shovels, with large rigs taking the longest.

Nearly all heavy equipment manufacturers checked say that sales last December and in January topped the same months a year ago; several have big backlogs. A report from San Francisco says Mack Truck's plant has on hand twice as many orders as it can handle normally. Euclid doubled its output in 1955 over 1954, but this wasn't enough to meet the heavy demand which continues this year.

Large backlogs and expectations for a further rise in sales during 1956 have prompted equipment makers to up production. Caterpillar Tractor is reported to have geared up for a 25% increase over 1955 output. LeTourneau-Westinghouse stocked up with heavy inventories during this winter, but it expects heavy sales to deplete these stocks fast and shortages to crop out within 60 days. Furthermore it expects a larger backlog and consequent slower deliveries this summer than last.

Some manufacturers are allocating shipments, but this is being done only on a limited basis so far. However, a Birmingham distributor notes that while equipment is not being allocated to him, the situation for some equipment amounts to the same thing. A Baltimore distributor reports that "Cat" engines are the only item he handles which is on allocation. LeTourneau-Westinghouse says its shipments are "not yet" on alloca-


Lays 1800 feet of FINISHED CURB per day!

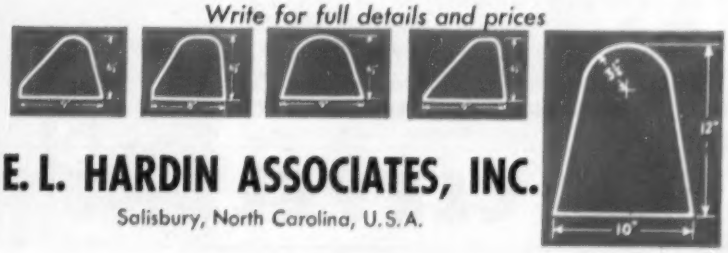
New Stephens-Canfield AUTOMATIC CURBER Saves time and money . . . uses no forms!

The Stephens-Canfield Automatic Curber is self-propelled and requires only three men to operate.

Simply mark out location, start the motor and fill the hopper with asphaltic or Portland Cement concrete . . . compaction pressure does the rest; the operator merely guides the Curber!

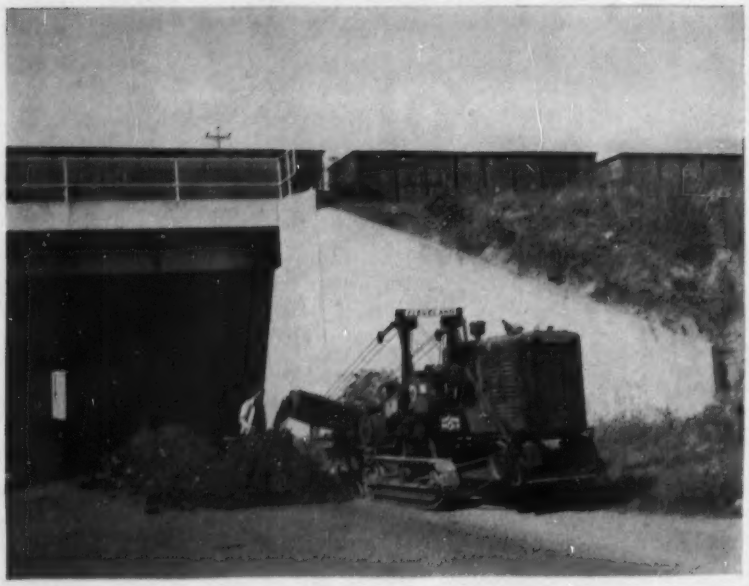
The Stephens-Canfield Automatic Curber lays straight or curved curbs on subgrade, base or finished pavement. Adjustable wheels allow this versatile Curber to be raised or lowered to permit pouring of curbing in various sizes from 6" to 12" high. Interchangeable molds provide a choice of eighteen different shapes from 6" to 12" high and 7" to 10" base width. Lays up to 1800 feet of finished curb per day, without forms! Many state highway departments are today saving time and money with the Stephens-Canfield Automatic Curber!

*Write for full details and prices*




**E. L. HARDIN ASSOCIATES, INC.**

Salisbury, North Carolina, U.S.A.



**SNUG TO THE WALL** of a railroad underpass is the trench being dug by this compact Cleveland "Baby Digger." Its ability to put the edge of a trench within less than two feet of a parallel wall is but one of this Cleveland's many practical operating advantages.

**DIGGING CLEAN AND FAST** the same Cleveland "Baby Digger" turned out high daily production on this job. With more than 30 usable digging speeds at the operator's command, the Cleveland cut cleanly through pavement and heavy root growth for trench 22 inches wide by 41 inches deep.

*Talk it over with your Cleveland distributor*

**THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio**

**CLEVELAND**

## IT'S YOUR BUSINESS . . .

**Continued from page 27**

tion. Some Philadelphia distributors report allocations in effect on crawler tractors, tractors with rubber-tired scrapers and with scrapers without rubber tires, crawler cranes, crawler power shovels, and draglines.

Deliveries showed signs of improving in a couple of cities in February. Four out of six Detroit distributors noted this trend, and certain St. Louis dealers said deliveries are getting better even, on some allocated items.

But, the situation hasn't eased in many other cities. In Pittsburgh, for instance, some makes of tractors and scrapers cannot be ordered. Deliveries on other types of heavy equipment, except trucks, are much slower than normal, and most orders are being taken 18 weeks in advance.

Several Philadelphia distributors sum up the present picture as one where some types of equipment are short and deliveries slow or even extremely extended. Yet a similar rig of a "non-big-name" equipment can be ordered out of stock at times. A very short supply of tractors with rubber-tired scrapers is attributed to anticipation buying to insure deliveries by the time contractors need them. This has been particularly heavy on smaller machines.

Birmingham distributors' stocks are short for heavy equipment, except trucks. Their December and January sales were the highest in history, and sales volume is expected to continue high for three years or more because of Alabama's big highway program and the prospects of increased federal aid for highway construction.

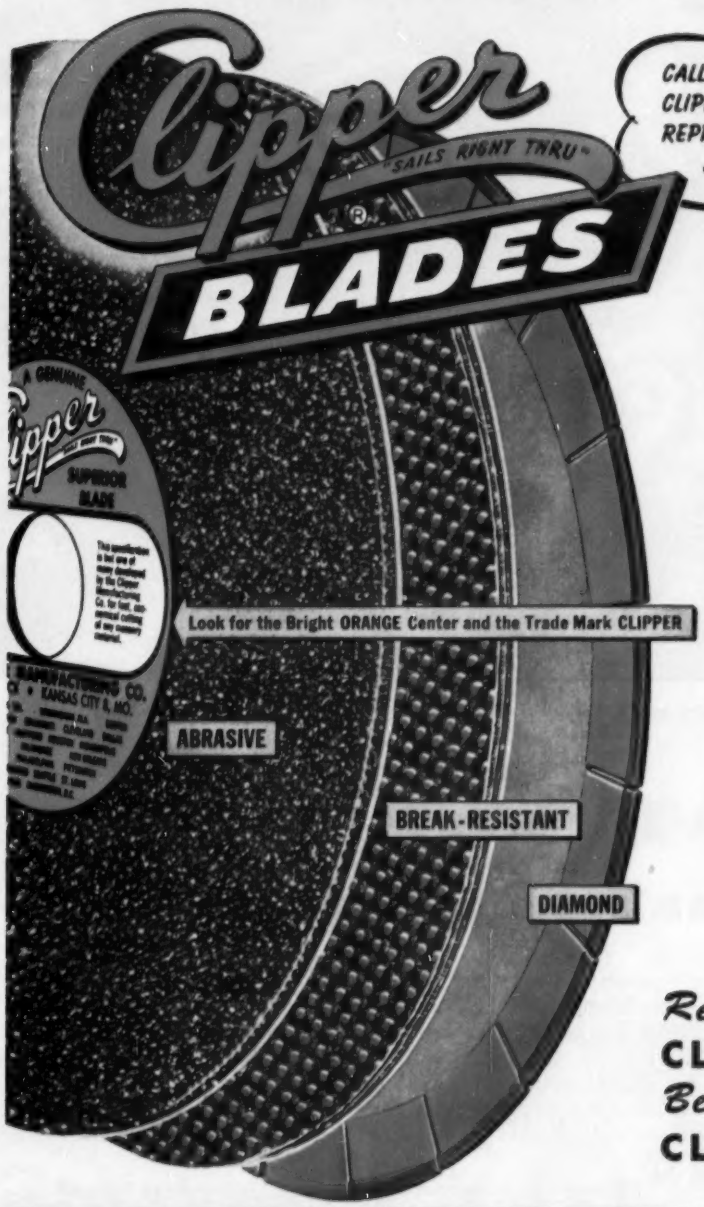
Deliveries to Seattle distributors are slow for most types of heavy equipment. Stocks of cranes, shovels, and motor graders are short. Contractors complain that manufacturers' production schedules do not call for adequate production to meet deliveries required in this area at this time of year.

San Francisco dealers report that while cranes, shovels, and draglines of up to 2 cu yd capacity can be delivered in 30 days, larger sizes take six to eight months.

Denver dealer stocks are low on rubber-tired equipment. Though deliveries from manufacturers are slow, adequate stocks of other types enable distributors to give contractors normal deliveries.

*(Continued on page 257)*

# CLIPPER *Sells* MORE... *Because* CLIPPER *Sells* QUALITY!



## BLADE *for* BLADE
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## *Your BEST BUY is CLIPPER!*

● Clipper offers the only complete range of specifications in ABRASIVE, BREAK-RESISTANT and DIAMOND BLADES for cutting all masonry products...and only from Clipper can you get FACTORY-TRAINED REPRESENTATIVES to help you with your cutting problems. For FIRST QUALITY Products and FIRST QUALITY Service call Clipper . . .

*You Cannot Buy A Better Blade than Clipper!*

*Remember...*
**CLIPPER *Sells* MORE**
*Because...*
**CLIPPER *Sells* QUALITY!**

Clipper "SAILS RIGHT THRU" KANSAS CITY, MO.

Better Mail the Coupon NOW!

● Genuine Clipper Products are Sold Only Direct, by Factory-Trained Representatives from Factory Branches in Principal Cities, Coast to Coast. Consult Your Phone Book, or Mail Coupon for Same-Day Service.

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- ☐ Send complete information on NEW Clipper Triple-Reinforced Break-Resistant Blades. I'd also like to know about:
- ☐ Clipper Diamond Blades
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- ☐ Please have my FACTORY-TRAINED REPRESENTATIVE Call on me.

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ADDRESS_____

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# Gardner-Denver... Serving

Gardner-Denver Self-Propelled Air Trac Drills. 36 of these are working on the job.

# Again... Gardner-

## ...for heavy-duty rock work

**Project:** Over six million cubic yards of rock excavation on the 125-mile Massachusetts Turnpike, reaching from the outskirts of Boston to the New York state line.

**Contractors:** A dozen big-name contractors from throughout the northeastern part of the country have chosen Gardner-Denver rock drills and portable compressors to help speed their contracts.

**Gardner-Denver Equipment:**

**79** Heavy-Duty Gardner-Denver Rock Drills—more than all other makes combined. Included are:

42 Gardner-Denver Wagon Drills
36 Gardner-Denver Air Trac® Drills
1 Gardner-Denver Tractor-Mounted Drill

**17** Gardner-Denver Compressors, supplying over 6,000 cfm of air power for the drills. On site are famous Gardner-Denver Rotary 600's, as well as Gardner-Denver 500 and smaller Portables, and Stationary and Tractor-Mounted Compressors.

the World's Basic Industries

Gardner-Denver Wagon Drills. Contractors have 42 of these drilling rock cuts on the project.

# Denver is first choice
## on the Massachusetts Turnpike

Let us tell you some of the sound reasons why Gardner-Denver Portables, Rock Drills and other Construction Equipment are so often first choice when rock work is contracted for. Write today.

Gardner-Denver Rotary 600 Portables, three of the 17 Gardner-Denver Air Compressors on the Massachusetts Turnpike project.

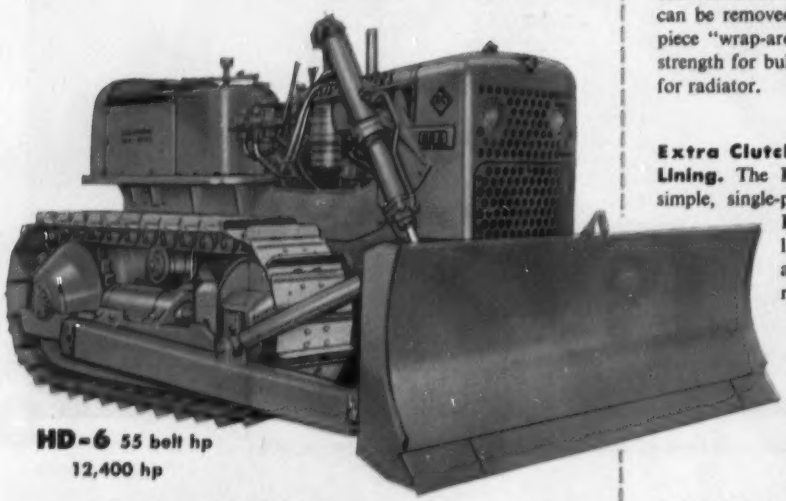
**GARDNER - DENVER**

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

# This kind of Crawler Tractor Design gives you extra output



**HD-6** 55 belt hp
12,400 hp

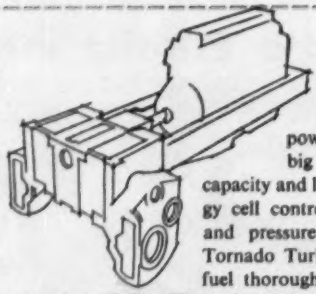
**. . . and only Allis-Chalmers HD-6 has it—**

**advanced design features that combine big performance, versatility, dependability and simplified servicing!**

Look at the Allis-Chalmers HD-6—you can see its functional design . . . how it's built to give sure-footed traction, better working balance. But there's more to this crawler tractor than meets the eye—the performance advantages of Allis-Chalmers advanced basic design. It provides more working power, more strength in all components, more working weight where it's needed . . . makes the HD-6 an outstanding performer with drawn or mounted equipment . . . easier to operate and maintain.

Let your Allis-Chalmers dealer show you how the HD-6 can give you that *extra* output on your jobs.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

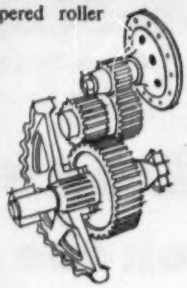


**Allis-Chalmers Heavy-Duty Diesel Engine.** The HD-6 power plant is designed for big output, ample reserve capacity and low maintenance. Energy cell controls combustion timing and pressures for high efficiency. Tornado Turbulence mixes air and fuel thoroughly for more complete burning. Follow-Through combustion sustains effective working pressures to take advantage of better crankshaft leverage.

**Special Strength and Protection.** Exclusive all-steel box-A main frame makes possible superior over-all balance, better equipment mounting . . . plus service simplicity of unit construction. Major assemblies like engine and clutch can be removed without disturbing adjacent parts. One-piece "wrap-around" radiator guard provides maximum strength for bulldozer mounting . . . complete protection for radiator.

**Extra Clutch Life—with Ceramic Lining.** The HD-6 master clutch offers simple, single-plate, over-center design. Revolutionary new ceramic button clutch lining keeps clutch operating longer between adjustments . . . lengthens clutch life . . . reduces lever pull for easier operation.

**Straddle-Mounted Final Drive Gears.** Tapered roller bearings support both ends of the final drive gear shafts. Smaller gears and shorter shafts (plus line-bored, one-piece case), provide better bearing and gear alignment, more strength, longer life. Double-reduction final drives provide greater ground clearance.



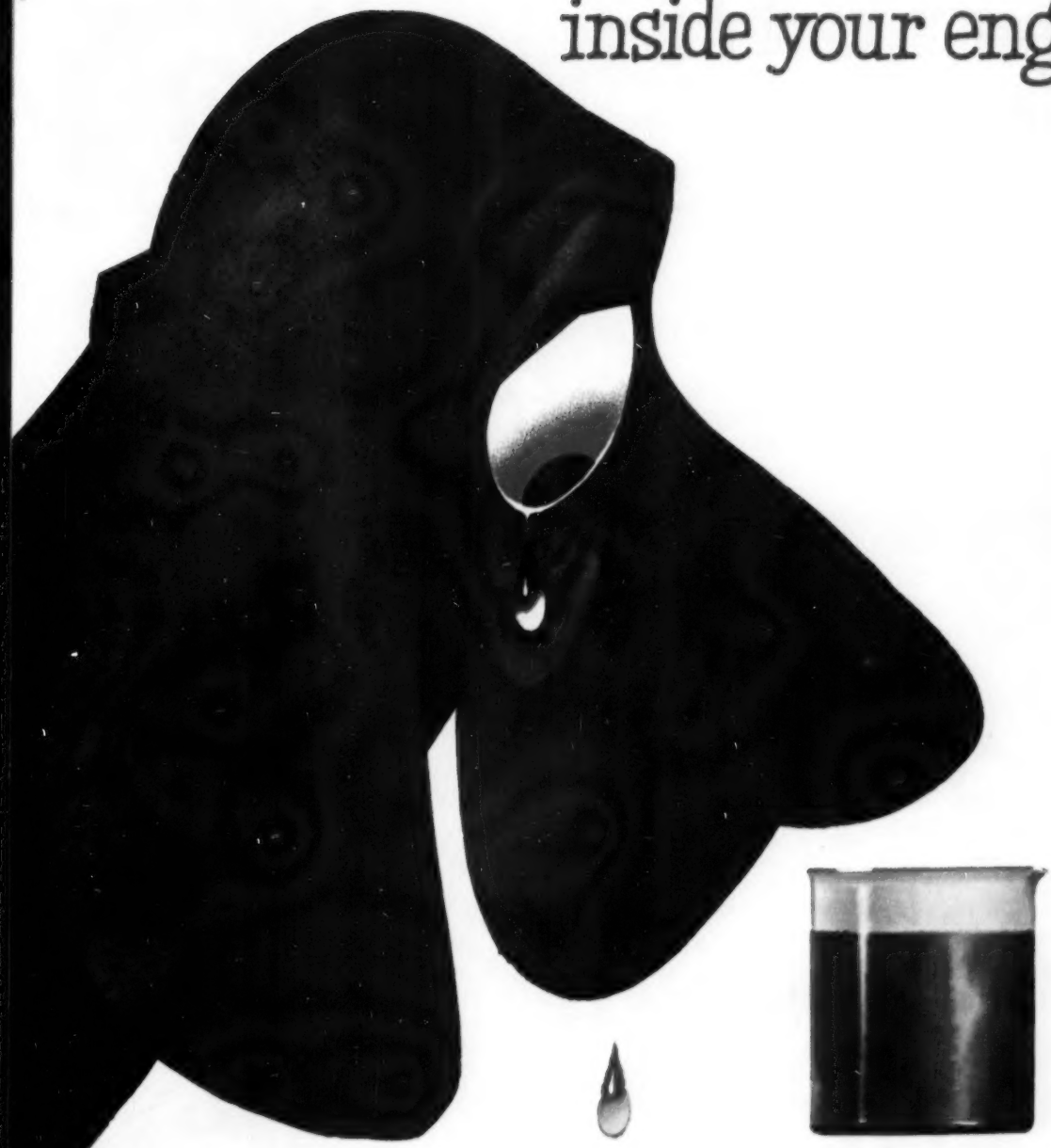
**New-Design, Heavy-Duty Track.** HD-6 track provides long life under the toughest conditions. HD-6 sidebars have more steel where it's needed . . . benefit from new heat-treating methods which make possible new standards of strength and hardness throughout for extra wearability.

**Other Outstanding HD-6 Features**

. . . no other tractor in this size class has them—at no extra cost you get roller bearing truck wheels, idlers and support rollers; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting; crankcase guard; bumper; and lights.

**ALLIS-CHALMERS**

# **PURE** doesn't need a Bloodhound to sniff out trouble inside your engine...



**Just give us one pint of your used oil... we'll give you a complete engine analysis—FREE!**

# Free Pure Oil service saves costly engine repairs

**Pure-sure Used Oil Analysis tracks down hidden engine trouble . . . cuts operating costs—increases efficiency.**

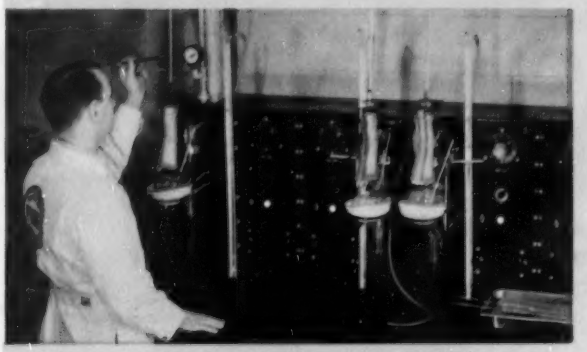
By analysing just one pint of used motor oil, Pure Oil scientists can give you a complete report on your fleet engine's condition. What they find may save you costly repairs. Or they may tell you how to cut operating costs. Or increase efficiency.

Pure-sure Used Oil Analysis is offered *free* on a regular basis to fleet users of Pure Oil products. They find it's just like looking inside the engine without even taking the head off. What's more, the unit is on the road carrying a payload while the analysis is being made.

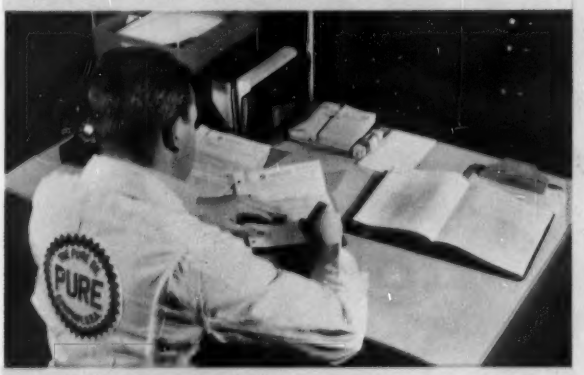
To show you how valuable this free service can be to your fleet operation, Pure Oil wants to give you a *free* Used Oil Analysis for one of your units. Call your nearest Pure Oil office or mail the coupon for complete details.

**This offer limited to the 24-state area where Pure Oil products are sold.**

## Here's how it works:



Your pint of used motor oil is run through 17 controlled laboratory tests by Pure Oil technicians in the Research and Development Laboratories at Crystal Lake, Illinois.




From the results of the analysis, a complete report is sent you recommending changes in operating procedure or warning of possible engine trouble.

Serious engine damage—such as this piston failure—can then be avoided or corrected. You save a possible big repair bill and costly down-time.

**THE PURE OIL COMPANY, DEPT. 6**
35 East Wacker Drive, Chicago 1, Illinois

Without cost or obligation, please send me information on how I may obtain a Pure-sure Analysis of my used oil.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

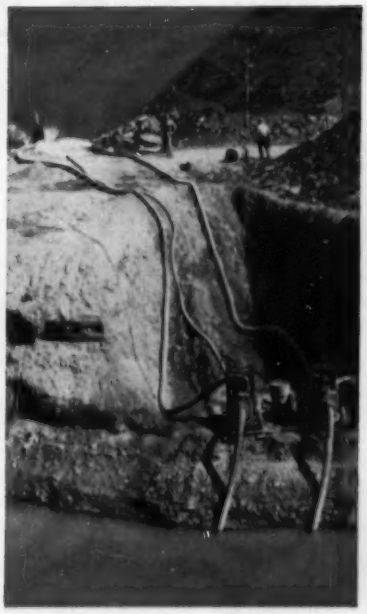
**Be sure with Pure**

BE SURE PURE WITH PURE

601

(Advertisement)

DEWATERING COFFERDAM BELOW CUT-OFF POINT of timber piles for Wilmington River bridge piers on US 80, outside Savannah, Ga. After piles were driven to refusal, 8′ concrete tremie seal was poured. These two Jaeger 4″ pumps then unwatered cofferdam again for placement of 4′ reinforced concrete distribution block. Bridge has 14 of these twin-shaft piers. McMeekin Construction Co., Cheraw, S. C.



24-HOUR-A-DAY PUMPING for approximately 9 months each year for the past 3 years, demonstrates the dependability of this pair of Jaeger 6″ Sure-Prime Pumps. Aughenbaugh Coal Co. strip mine, Curwansville, Pa.

IN EXCAVATION for new Southdale Shopping Center, near Minneapolis, Minn., Johnson, Drake & Piper used this Jaeger 3P to pump inflow from spring into sewer line.

DIESEL POWERED 6″ PUMPS deliver rated 90,000 gph at efficient diesel engine speed of 1450 rpm. Ideal for continuous pumping of long ditches draining sand below Lake Erie water level for Erie, Pa., sewage disposal plant addition. Rust Engineering Co., Pittsburgh, Pa.

# They bet their shirts on Jaeger Pumps

There are good reasons why such a high percentage of experienced contractors use Jaeger Sure-Prime pumps on their work. Size for size, your Jaeger Sure-Prime has a larger shell and impeller so that it holds more priming water and is subject to less concentrated wear. Its engine is of the highest horsepower applicable. You gain the advantage of two independent, simultaneous priming actions for fast, sure priming, and you prime and pump at slower, longer-life engine speeds. Some pumps run at 2000 rpm to do what a Jaeger does at 1400. This high efficiency is maintained by positively lubricated "Lubri-Seal" — the only pump seal that is provided with a ready-inspection port.

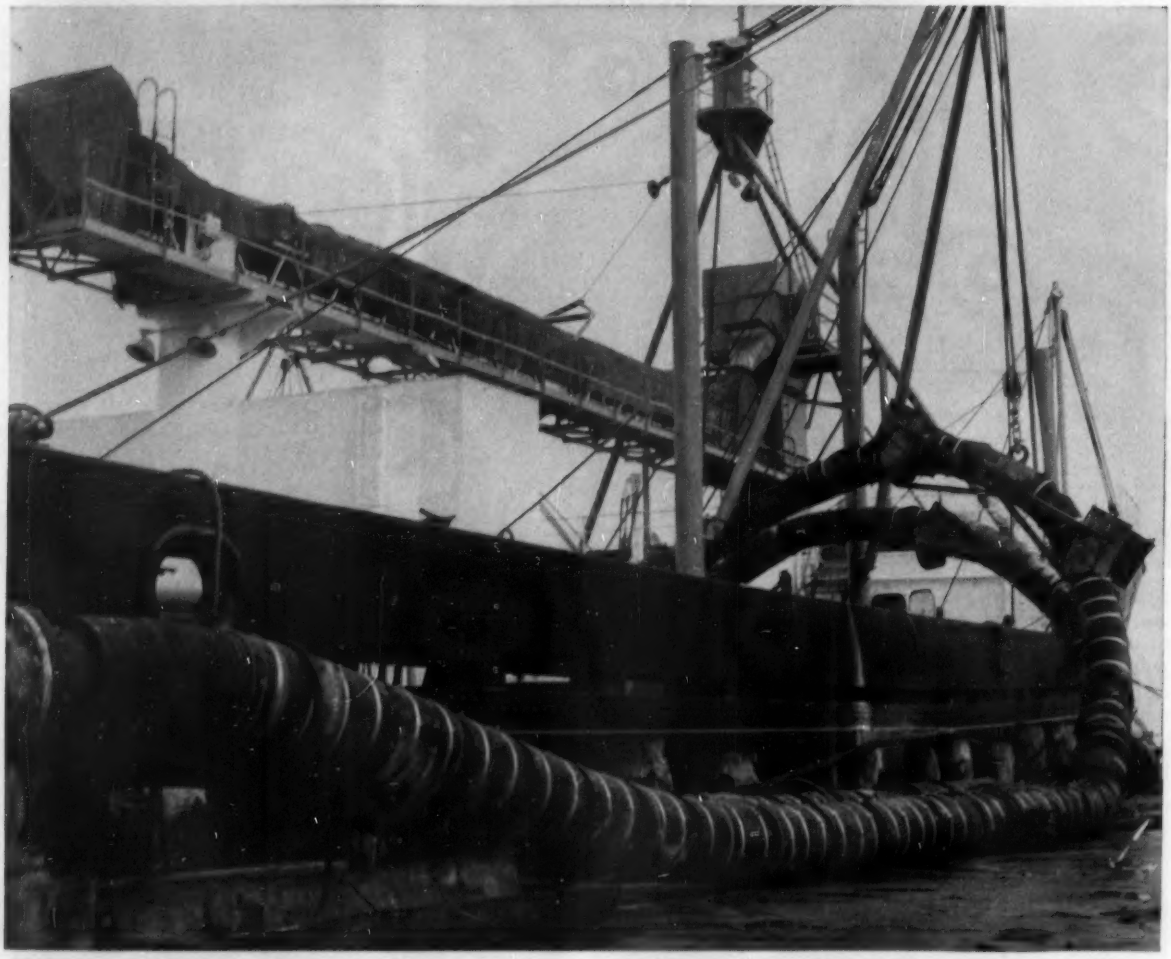
For 4000 to 240,000 gph capacities — or pressures to 275 psi — there's a Jaeger pump built to do your job. See your Jaeger distributor, or send for Catalog P4.

**THE JAEGER MACHINE COMPANY**

**800 Dublin Avenue, Columbus 16, Ohio**

COMPRESSORS • MIXERS • TRUCK MIXERS • SPREADERS • FINISHERS • LOADERS

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



# There goes a turnpike in the rough

*A typical example of B. F. Goodrich improvement in rubber*

IT'S down the hatch—20 barrels a minute—as dry cement whistles through that hose and pours into the ship's hold.

A wonderful idea—pumping cement through hose—much faster, far cheaper than individual sacks that had to be carried on and off the ship. Only one trouble.

Turn off the pump, and the hose would collapse, putting permanent dents in the coil of solid steel wire buried in the rubber. B. F. Goodrich engineers went to work on the problem, and came up with a new hose design. They put a spiral of flexible steel cable in the hose body. That makes the hose flexible as well as strong, so it always returns to full round shape under pressure.

The B. F. Goodrich hose was tried, and works perfectly. It has carried more than 1½-million barrels of cement—enough to pave a 100-mile stretch of turnpike—and shows no sign of wearing out.

Product improvement is *always* going on at B. F. Goodrich. Some improvements are big, spectacular; some are little; many are too technical to explain easily, but all save you money. If you use hose, belting or other rubber products, remember B. F. Goodrich is one company that will *never* lower its quality standards. This means you can be sure of top performance and real money savings.

To get this extra value, these lower costs year after year, call your B. F. Goodrich distributor. Find out about the latest improvements or try out the latest and best types of any rubber products you buy. *The B. F. Goodrich Company, Dept. M-585, Akron 18, Ohio*

**B.F.Goodrich**
**INDUSTRIAL PRODUCTS DIVISION**

PICTURE OF THE MONTH

CONSTRUCTION METHODS AND EQUIPMENT

# Driving Ahead

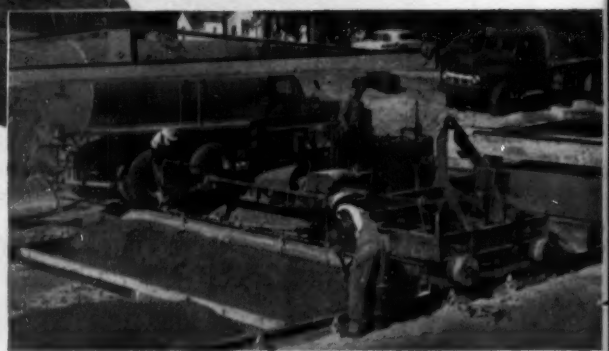
SANDHOGS lock another ring into place for the 5,486-ft third tube of the Lincoln Tunnel under the Hudson River between New Jersey and New York City. Cast iron ring sections form the permanent outer sheathing of the tunnel. Each has an outer diameter of 31 ft, is 32 in. wide, and is made up of 14 segments of 7-ft lengths and a small locking segment. A hydraulically operated erector arm thrusts the ring segments into place. Then a huge pneumatic wrench bolts them together. Mason-Johnson-Maclean is joint venture contractor for the Port of New York Authority.

*Two Flex-Plane Finishers used in tandom by A. J. Baltes Construction Co., on section of Ohio Turnpike*

*Western Contracting Co. operated two more on still another section of Ohio pike.*

# FLEX-PLANE

*J. C. O'Connor and Sons operate Self-Widening Flex-Plane on section of Indiana Turnpike.*



*J. A. Tobin uses Flex-Plane working low slump concrete on section of U. S. 69 near Kansas City, Mo.*

Heltzel Steel Form and Iron Co. — Warren, Ohio

Flex-Plane Equipment Corporation — Warren, Ohio

**WORLD'S LARGEST BUILDER**

*Self-widening machine used by Peter Kiewit on a midwestern turnpike interchange.*

*The Flex-Plane machine takes gradework in stride. Here Harrison Construction Co. works cloverleaf with a self-widening unit.*

# ..... the nation's most popular Finishing Machine

9892

Here's the finishing machine that has outsold all others for the past two years. The Flex-Plane has been the most flexible machine of its type ever built . . . and the 1956 model is no exception.

Upon a sturdy triple-lap frame, that extends hydraulically at the flick of a finger, is a power-packed engine that will easily handle the toughest finishing jobs. Users often work them without spreaders.

There is the Flex-Plane originated hydraulic transportation rig that transforms the machine into its own trailer in a matter of seconds. And, the Flex-Plane Self-Widening feature, that proved so popular last year, has been improved for 1956.

Add to these outstanding features the new Flex-Plane screed that holds rigid and true under any condition, yet takes a crown speedily, with a minimum of down time. Remember, too, Flex-Plane screeds are outside the frame where they belong for easy maintenance and better finishing.

Again we say, look them all over, talk to users, and we're sure you, like dozens of other leading contractors, will specify Flex-Plane Finishers from this point on.

**THE FLEXIBLE ROAD JOINT MACHINE COMPANY**
6400 Thomas Road — Warren, Ohio

*While working turnpike Calumet Construction Co. found Flex-Plane flexibility paid dividends.*

*On Garden State Parkway the Weldon Construction Co. put their second Flex-Plane through its paces.*

*The Union Building and Construction Corporation uses a pair of Flex-Planes to finish slabwork on Indiana Turnpike.*

**OF CONCRETE FINISHING EQUIPMENT**

(Advertisement)

# WIRE ROPE TALKS

**SUBJECT:**

STORING WIRE ROPE OUTDOORS

Practical hints on the use and care of wire rope by Robert M. Kilian, Chief Engineer of Leschen Wire Rope Division, H. K. Porter Company, Inc.

**QUESTION:**

What is the best method of storing wire rope outdoors?

**ANSWER:**

If you think of wire rope as a machine of many parts built to close tolerances, you quickly understand why it should be protected from outside exposure, particularly from weather that involves dampness or humidity. Extended exposure under severe conditions will impair wire rope to the point of substantially reducing its effectiveness. After idleness and lack of care it may be of little use.

For example, rust tends to bind wires together so they are not free to move back and forth. Then they fail to adjust themselves when lifting or pulling a load. They do not move properly in operation around sheaves.

### Lubrication and Cleaning

The outer layer of new wire rope to be stored on its shipping reel should be covered with a heavy protective lubricant. A generous application will tend to protect the entire length. "LePro" Wire Rope Protector, a Leschen product, is especially formulated for this purpose. You apply it cold, and it goes on quickly with a brush or by pouring slowly from a can.

Wire rope removed from service, to be stored for future use, should be cleaned thoroughly with a wire brush, compressed air, or superheated steam. Then lubricate it first with a penetrating lubricant that will coat all strand wires, internally as well as externally. Next coat the rope with "LePro" to seal in the other lubricant and repel penetration of moisture and fumes. Finally, wind the used rope on a reel, rather than let it lie loosely on the floor or ground.

Following lubrication with "LePro" it is advisable to cover the rope on the reel with waterproof or tar paper. Seal the paper at the flange with "LePro". If a number of reels are stored at one spot, cover the entire group with a tarpaulin.

Taking proper care of high-quality products like HERCULES Red-Strand wire rope is as important as selecting them in the beginning. You are money ahead on both counts.

### Storing and Re-Use

Select a storage area that is clean and dry, and as well protected from the weather as possible. Avoid nearby acid fumes or other corrosive agents. They can cause embrittlement of the surface of the wires. Reels should not rest directly on the ground. Place them on wood or metal supports.

When rope is returned to service, excess lubricant can be wiped off as the equipment is run slowly. Lubricants may pick up some dirt later, but this will cause far less damage than would the leaching effect resulting from the use of a solvent for cleaning.

The higher-than-rated quality built into Leschen wire rope is well worth preserving by proper storage methods. To obtain this quality in the first place remember to specify the rope with a RED STRAND—the symbol of highest quality wire rope for seventy-five years.

A Leschen district warehouse or distributor is nearby. See them for other rope-saving suggestions—and for HERCULES Red-Strand Wire Rope.

*Reprints of this "Wire Rope Talks" are available on request*

LESCHEN HERCULES Red-Strand® WIRE ROPE

LESCHEN WIRE ROPE DIVISION

H. K. PORTER COMPANY, INC.

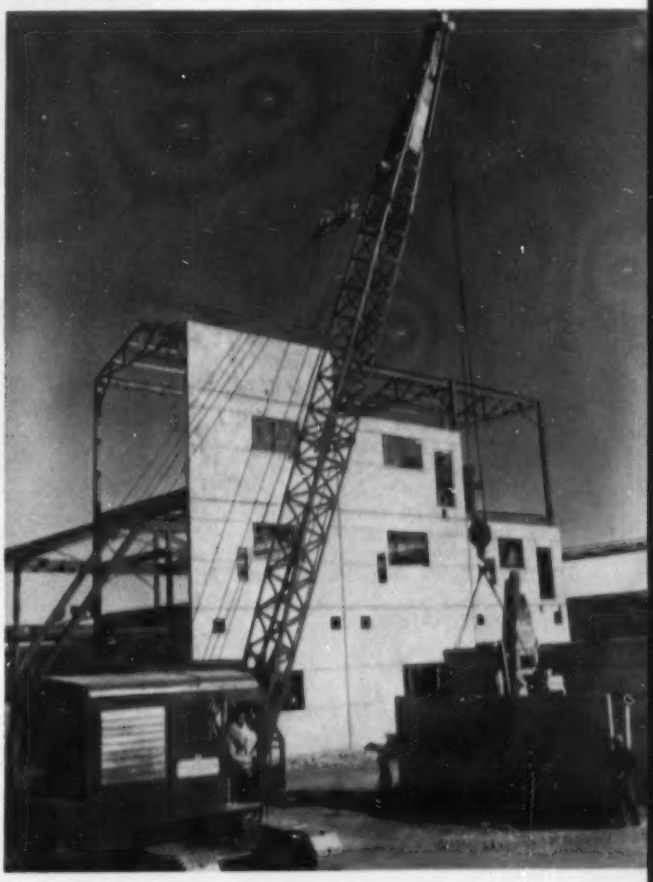
St. Louis 12, Missouri

HKP

# Construction News in Pictures . . .

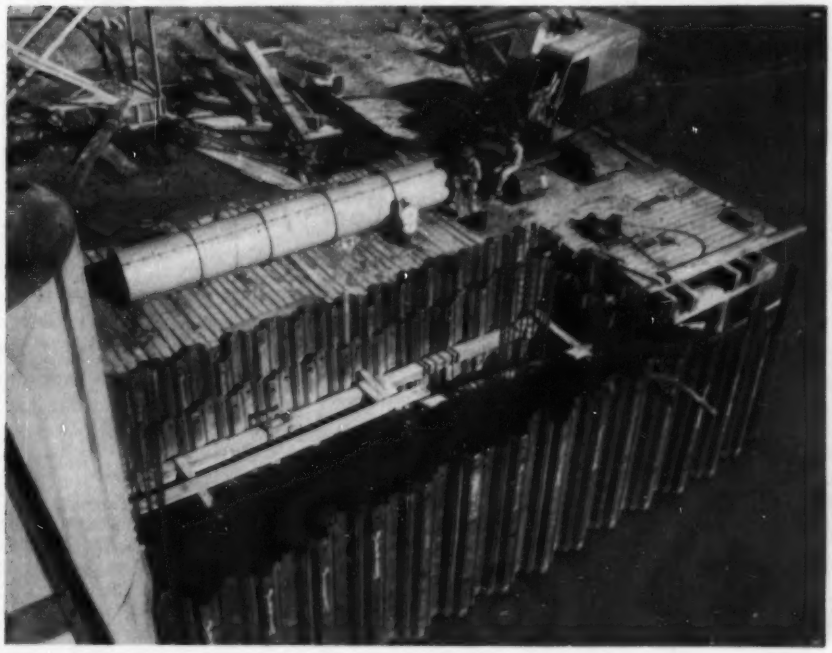
## Setting Piles in Alaska

A crew of Puget Sound & Drake Co. sets piling in flint-hard permafrost for a radar station at the northernmost point of land in Alaska. Equipment is LVT-mounted digger using a 14-in. Alaskaug auger to dig 14-ft holes.



## Pre-cast Wall Goes Up

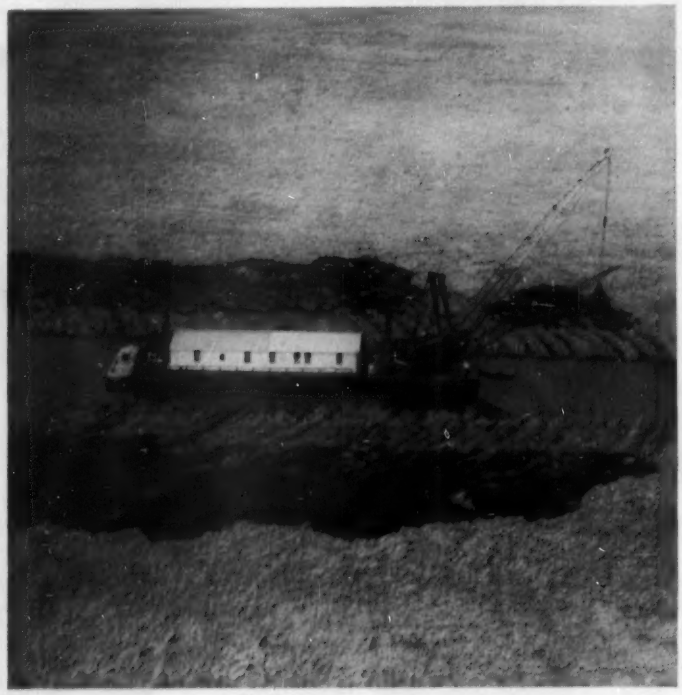
Concrete walls for an addition to the Frontier Chemical Co. plant near Wichita, Kansas, are cast in sections and placed on the steel frame by a Manitowoc 25-ton crane with a 60-ft boom. Sections weigh 6½ to 17 tons and must be put into place with extreme accuracy. Contractor is Soderberg Construction Co., Wichita.



## Two Cofferdams— One Bridge Pier

Bob Baker Construction Co., Brownwood, Texas, had to build two cofferdams, one around the other, to construct a pier for a bridge over the Colorado River near Eagle Lake, Texas. Sheet steel piling for the first cofferdam was 28 to 30-ft lengths, driven 7 ft below grade, the usual depth in the area. But it started to "blow in." Baker figured a second cofferdam of 45 to 47-ft piling driven 22 ft below grade was the cheapest and fastest solution. L. B. Foster Co. supplied piling.

*(Continued on next page)*



## Dredge Is Floating City

Digging access canals to oil fields south of New Orleans, La., calls for unusual equipment. Robichaux Bros., Harvey, La., operates a specially built rig that mounts a standard Manitowoc 4500 crane and includes ample living quarters, power system, and communication facilities. Dredge operates 200 mi from its home base and can be reached only by sea plane or speed boat. It was constructed at Manitowoc, Wis., and towed down the Mississippi.

## Frozen Earth Is Tough to Handle

Winter excavation for the St. Lawrence Seaway involves moving big chunks of heavy frozen earth and boulders. C. A. Pitts, Ltd., uses a 6-yd Lima shovel to load C&D Movalls powered by Caterpillar DW21's on the marine channel excavation at Galop Island, Ontario.

## Placing Forms at Buford Dam

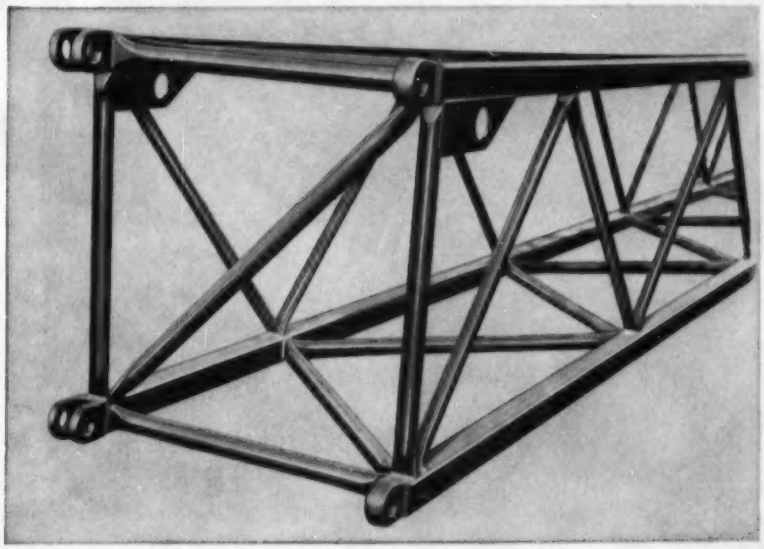
Tunnel sections of the turbine draft tube forms are in place at Buford Dam in Georgia, and a 30-ton Lorain Moto-Crane is placing 4½-ton elbow section forms. The crane works from a temporary construction bridge to which forms are brought by truck. About 30,000 yd of concrete will be poured for the powerhouse alone. Contractor is Ivey Bros. Construction Co., Atlanta.

(Advertisement)

# NEW LORAIN CRANE BOOM

## Square Tubular Chords . . . Tubular Lacing . . . Increased Capacities with Less Weight, More Strength

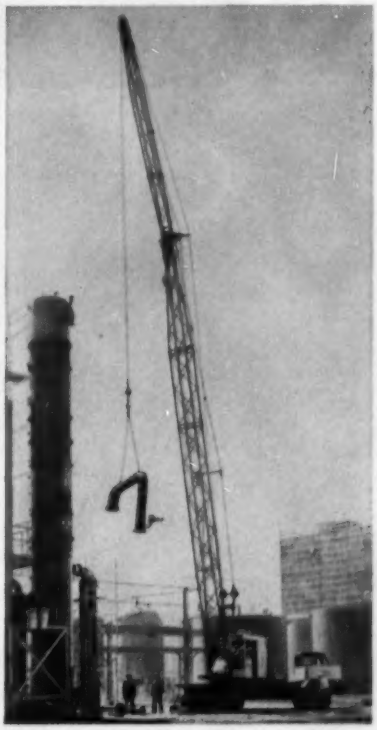
**Thew-Lorain Crane Boom Design Increases Lifting Capacities . . . Permits Handling and Traveling with Longer Booms . . . Other New Crane Boom Features Provide Ease of Assembly Plus Total Lengths to 150 Feet***



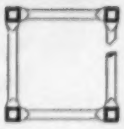
Here's a brand new Crane Boom design that reduces boom weight 20 to 30%. Lighter, yet stronger, you can now put this weight saving to work for you in increased lifting capacities. The new Lorain "Square Tubular" Crane Boom is based on a new material and design idea. Departing from the conventional angle or tube construction, Thew-Lorain has selected square tubular members for the main chords of the boom. These are laced together with continuous lengths of round tubular lacing, preformed and welded to the square chords. The method of fabricating the lacing to the chords requires less lacing, saving weight, yet gives the same high torsional resistance and columnar strength as obtained by "banding" the boom. This revolutionary, new crane boom design is available as standard equipment on Lorain 8, 10 and 25-ton crawler cranes and 10, 22½, 25 and 30-ton rubber-tire cranes.

### HANDLE LONGER BOOMS

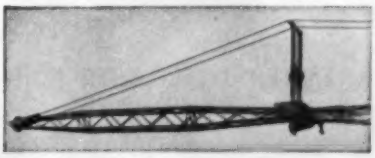
The new, "Square Tubular" Crane Boom design, with greater strength at reduced weight, permits (1) increased lifting capacities, (2) raising longer booms from flat position, (3) traveling with longer booms over the rear. Crane sections are equipped with "erecting lugs" for ease in assembling long booms.



*This shows a cross-section of the new "Square Tubular" Crane Boom design on which Thew has applied for a patent on the construction of this equipment and the method of fabricating it.*



### *2-PIECE TIP EXTENSION



The same principle of square tubular main chords, as used in the main boom, has been applied to the Tip Extension to give maximum lifting capacities at minimum weight. Tip extensions are made in 2 pieces, with suitable center sections, to permit varying overall length to meet job needs. For instance, on Lorain's 30-ton Moto-Crane, 150 ft. of boom including tip extension may be used. Tip extension may be used as straight or gooseneck extension.

### TILTING MAST-TYPE GANTRY

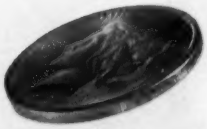
Recommended for use with all long booms . . . (1) for easier raising of booms from flat positions, and (2) to reduce stresses in long booms, pendants and cables while operating. Fabricated of square tubes, Gantry is hinge-pin connected to the Boom base and may be lowered for travel, or easily removed.

### 3-SHEAVE BOOM HEAD

This 3-sheave Boom Head permits reeving 6 parts of hoist line without the use of a top block and the resulting loss of vertical working range. Boom Heads are designed for ready installation of tip extensions or pile driver leads.

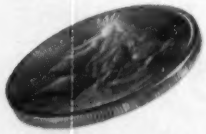
**THE THEW SHOVEL CO.**
**Lorain, Ohio**

# Athey MON for



## BIG ADVANTAGES IN TRACTOR-TRAILER MANEUVERABILITY

Athey-Cat Tractor-Trailer maneuverability means faster cycles, higher production and bigger profits. Articulated "universal joint" design of all Athey-Cat units gives maneuverability impossible in rigid frame trucks. With the Athey PR21, shown here, you get under the shovel quicker, work faster in tight, narrow quarters, take sharper turns at higher, safer speeds and get in . . . dump . . . and get off the fill in shorter time.



## FASTER CYCLES WITH NON-STOP DUMPING

"On-the-go" dumping and high speeds clip cycle time, provide more economical one-way traffic, increase production. Exclusive Athey stabilizing jacks in the PD20 Side Dump Trailer assure built-in safety while dumping. Fills are compacted with big tires . . . material is evenly distributed. Matched in design and performance, the PD20 is built specifically for the world-famous Cat DW20 Tractor.

# EY MAKERS

## Bigger CONSTRUCTION Profits!

**SPEED AND BIG PAYLOAD FOR LONG HAULS**

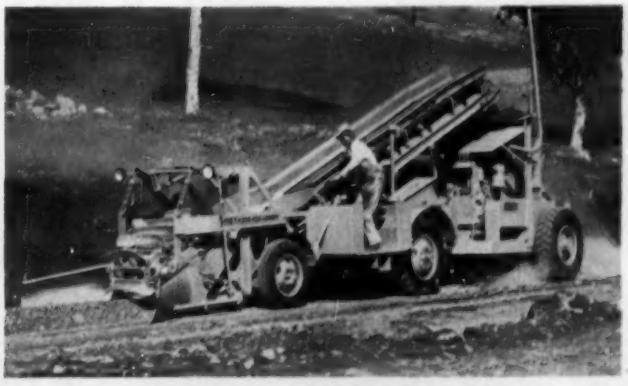
High speed, universal joint design and 31 ton capacity make the PR20 Rear Dump Trailer a real money-maker. Especially designed for jobs that require a big capacity unit on long hauls.

**FASTER LOADING, LESS SPOTTING TIME**

Patented, full-floating feeder of the Athey 125 HiLoader digs into stockpile or windrow, loads wide variety of material. Swiveling conveyor loads trucks at left, right or behind . . . saves spotting time, cuts delays. Loads 10 to 25 cubic yards of material per minute.

**TOP SPEED AND MANEUVERABILITY**

Newest of the Athey-Cat Tractor-Trailer units is the fast PR15-DW15 Rear Dump Team. More maneuverable than a pick-up, the 22-ton capacity PR15 is easy to spot in seconds under shovels, in tunnels and other areas "off-limits" to conventional haulers. Cuts cycle time with higher speeds, fast 12-second dumping.

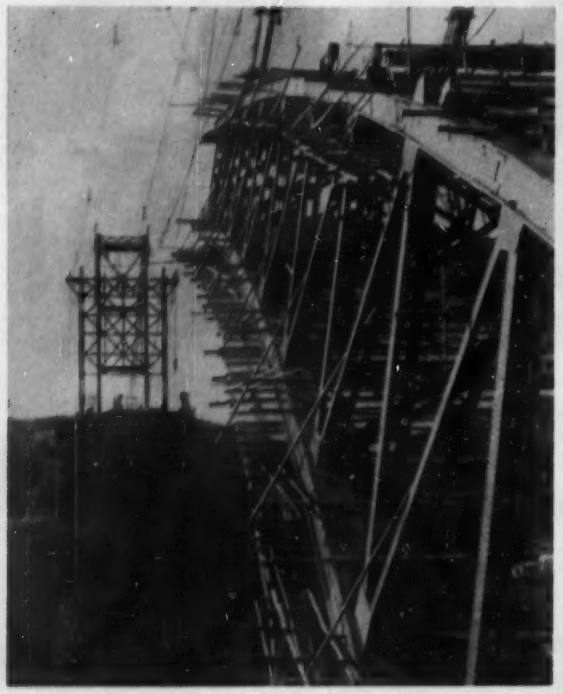


**30% TO 60% SAVINGS REBUILDING ROADS**

Bid road rebuilding jobs low and show a good profit. Money-making companion for the Athey Force-Feed Loader, the Athey Portable Breaker reduces old aggregate to desired size at a rate of up to 200 tons per hour . . . saves up to 60% over old methods of reclaiming roads.

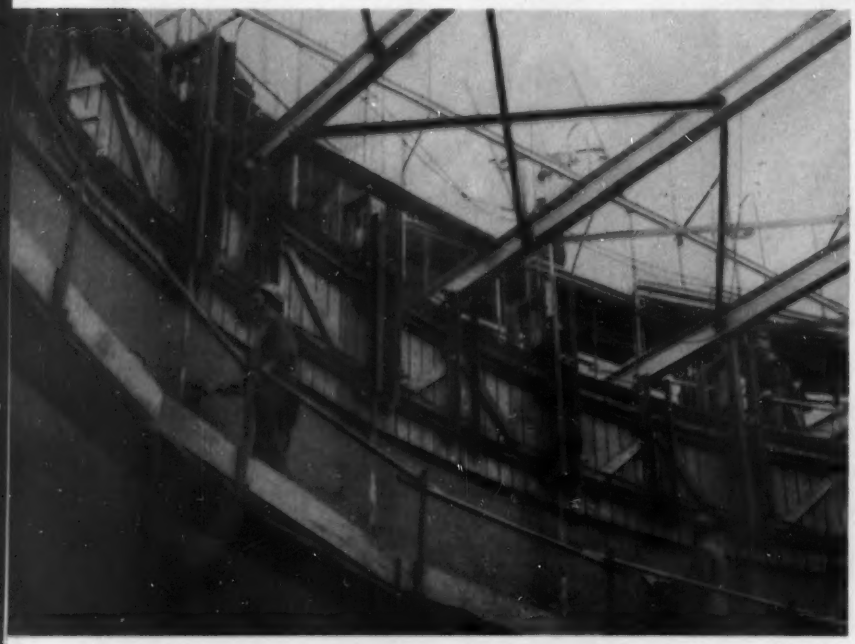
**ATHEY PRODUCTS CORPORATION,** 5631 West 65th Street, Chicago 38, Illinois

# Construction 'Round the World . . .



## In Japan . . .

Main arch truss of the 1,048-ft Inoura Narrows Bridge, Japan's longest steel arch span, is erected by an overhead cantilever tieback method with erection bents at both approach spans. Each half arch truss will have a vertical member at the crown for erection. After adding jacking force at the crown, vertical members will be replaced, and the halves spliced together.



## In New Zealand . . .

Diverting the Clutha River to a new dam at the Roxburgh hydroelectric project was a major earthmoving operation. At the halfway point, the river carried away more than 40% of the fill. Despite difficulties, diversion was completed in 18 hours. An Osgood crane built a jetty of sandbags, and Caterpillar D-8's moved earth down the hill to fill the jetty.

## In England . . .

Sliding panels lifted by hydraulic jacks form the walls of a prestressed sugar silo at Peppleton, near York. To maintain a true circle 66 ft in dia, John Laing and Sons, Ltd., of London, attached the framework of the roof structure to the formwork. Laing used 40 jacks spaced evenly around the circumference to support and raise the total load of 80 tons.

# Nylon cord tires reduced off-the-road tire failures...

# NOW NYLON CUTS TRUCK TIRE COSTS, TOO

**JOHN GALLAGHER, Gallagher & Burk, Inc., Oakland, California, reports:**

"We tried our first nylon cord tires on heavy, off-the-road equipment, where tires have to be able to take it. When we saw how they cut down tire failures, we began switching our trucks to nylon cords, too.

"Since then we've had far fewer truck tire failures—less carcass damage and fewer impact breaks. What's more, nylon cord truck tires give us 33% more retreads, a big help in bringing down tire costs.

**Plans an All-Nylon Fleet**

"There's no doubt about it—we're sold on nylon cord tires. With 350 now in service, we specify nylon cord tires for all replacements and on all new equipment. Soon we expect to have a 100% nylon cord fleet."

**PROVE TO YOURSELF** that nylon cord truck tires give more mileage, more retreads—lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

**DU PONT NYLON for TIRE CORD**

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

NOW . . . IN PASSENGER-CAR TIRES, TOO . . . THE STRENGTH OF NYLON . . .
FOR UTMOST SAFETY . . . SUREST PROTECTION AGAINST TIRE TROUBLE

**WORKING IN SOFT OR RAIN SOAKED SOIL** presents no problems for owners of sure-footed American cranes. When the going gets really tough they depend upon the extra-wide crawler pads, generous power, amazing stability and the fast, accurate control system of American Cranes to produce more on *any job anywhere!*

## Working at Extreme Radius—180° Swing . . .

# AMERICAN DRAGLINE AVERAGES 140 YARDS AN HOUR!

The story of the Monona-Harrison Drainage District of Iowa is one of high production. Recently, their American 300 Series Crawler Crane cut a new channel 1000 feet long, 20 feet deep and 100 feet wide. The 300 Series was rigged for dragline—equipped with a 50-foot boom and a 1-yard drag bucket. Even though it was working at extremely long radius and swinging 150 to 180° on every pass, L. C. Bennett, district engineer, reported that the American produced an average of better than 140 yards every hour in moving an estimated 44,500 yards of dirt!

When you can get top crane performance like this everyday regardless of soil conditions, you know your tough jobs will go on without delay. If you're erecting steel, handling concrete or other construction materials, ditching, excavating or filling, *you can rely on American Cranes!*

**HERE'S WHAT WAYNE TURNER SAYS:** "Our American has exceptional stability and traction in river slope work." Turner, who is the District's crane operator, has 25-years' experience in crane handling.

*(Advertisement)*

**WITHOUT CONSTANT MAINTENANCE,** rivers and ditches erode, banks wear away and fall into the water. Flood danger is increased and valuable soil lost downstream.

**AFTER REBUILDING,** banks in the Monona-Harrison District look like this. Erosion losses and flood damage have been greatly reduced as a result of the program.

**AMERICAN'S COMPLETE LINE** of crane-excavators starts with the surprisingly low cost Series 100—a compact machine that owes its long, dependable life to heat-treated alloy parts that "take a beating" every day. The versatile 100 Series operates at peak efficiency with any front—a real profit maker! On crawlers, the American 100 rates a full ½-yard capacity. On rubber tired chassis, it offers up to 15-ton capacities.

**BIG, BIG BROTHER** of the American crane-excavator family is the famous 700 Series. On crawler or rubber it rates as a 2-yard dragline, 1½-yard rock shovel or backhoe. For steel erectors: 50-ton crawlers, 45-tons on rubber. And the big 700 Series *isn't musclebound*, its finger tip air controls speed up every movement. Investigate, you'll find you move more, faster with an American of any size!

For more than three-quarters of a century, American machines and products have been chosen first for the biggest and hardest jobs in the world! You get full advantage of this outstanding record of service, experience and know-how when you buy American!

Detailed information on American Crawler and Truck Cranes is available at your nearby American Distributor, or write American Hoist & Derrick Co., St. Paul 1, Minnesota.

# AMERICAN HOIST
## and Derrick Company

**St. Paul 1, Minnesota**

# Gradall® REMOVES 2400 FEET OF CURB AND SIDEWALK PER DAY!

**Gradall loosens, lifts and loads** curb sections intact, grasping curb firmly against boom with its hydraulic bucket "wrist" action.

**First step.** Gradall smoothly breaks out and loads large 4 to 5-foot sections of asphalt sidewalk.

## Triples previous rate!

THAT'S THE AVERAGE turned in on this 120,000-foot San Diego job by the R. E. Hazard Contracting Company. By the two previous methods used, 800 to 1000 feet a day was considered very good.

Gradall first removed large sections of sidewalk, then cut out behind the curb, then grasped and loaded out curb sections intact. A cost-saving bonus resulted from the fact that the Gradall method eliminated repairs on pavement damaged during curb removal.

Supt. Wayne W. Wallace states: "There is no way at all you can take it out cheaper than with a Gradall."

Since delivery in December, 1954, Hazard's Gradall has averaged over 200 on-the-job hours every month! They keep this multi-purpose machine busy on a wide variety of jobs—often on work no other machine could touch, jobs where Gradall's power and arm-action accuracy really pay off.

Find out exactly how a Gradall can cut costs for you. Arrange a field demonstration now with your nearest Gradall Distributor.

®Reg. U. S. Pat. Off.

**Then Gradall digs out behind curb** prior to removal. It works easily under low wires or trees.

CRAWLER-MOUNTED GRADALL | SELF-PROPELLED GRADALL | RAILROAD GRADALL

**Gradall**
DIVISION OF WARNER & SWASEY Cleveland
PRECISION MACHINERY SINCE 1880

**Distributors in over 75 principal cities in the United States and Canada**

**YOU CAN DO IT BETTER, FASTER, FOR LESS WITH A GRADALL**

MARCH, 1956

VOLUME 38 • NUMBER 3

HENRY T. PEREZ, Editor

CONSTRUCTION METHODS AND EQUIPMENT

# Efficiency and Safety

ADVANCEMENTS in scientific management to boost efficiency of construction operations took the spotlight at a conference in Los Angeles last month (see p. 166). Contractors were challenged to adapt industrial engineering techniques to cut costs of their own operations. Some of these adaptations will be a long time in coming. But one cost cutter, not mentioned at the conference, is available to management immediately: Safety.

Today's ordinary management techniques certainly can be improved. So can management's thinking about accident prevention. For, as Alan Porter, American Bridge Co.'s vice president in charge of erection, puts it, "All too often there are members of management who would rather fight safety than try to understand it.

"The fullest effectiveness in producing safe operations cannot be had without management assuming the full responsibility. Passive interest is no good—the kind of interest that does something about it is what counts. The top executive must get into the act to the extent of establishing and implementing the policy that safety is the first consideration in all phases of the business.

"The man at the top can, and does, delegate [safety] responsibilities in whole or in part to other men of the organization, making these individuals responsible for performance. But he can never delegate the ultimate responsibility."

How true! Yet safety supervision too often seems to be turned over to just anyone who might possibly have some spare time now and then to devote to it. That's not safety—it's plain buck-passing. It's not fair to the individual tapped; nor is it fair to the men he is supposed to protect from hazards of the job.

A construction executive who would never dream of turning over supervision of concrete placing, steel erection, or earthmoving to semi-amateurs will often do just that with safety supervision. Yet competent, trained safety engineers are available. Here's just one case in point to illustrate what they might do for you:

Through the fault of no one person or thing in particular, the safety program of joint-venture contractor for a large military installation had bogged down. It had deteriorated so far that in the first five months of 1954 the job suffered three fatalities, along with a proportionate number of permanent disabilities and accidents in general.

The job had been underway since 1951, and had a three-man "safety team." The rash of accidents in the first half of 1954 prompted the contractor to bring in a trained safety engineer to manage these activities. Result: The joint venture has just won one of AGC's 1955 National Construction Safety Awards. An impressive switch in little more than one year's time.

Was it luck? Not likely. For the same safety engineer, working with another large contractor, had helped his firm win AGC First Place Awards —for two years running—immediately prior, in 1953 and 1954.

Of course there are many contractors whose scope of operation is not sufficiently wide to justify the employment of a full-time safety engineer. But that does not relieve them of responsibility for providing safe working conditions and seeing that an effective accident prevention program is carried out.

There are competently qualified safety engineers to give counsel on a part-time basis, to help train men in safety. Choose him carefully, as you do your lawyer, tax man, or outside consultant. Remember, it is still the quality of the man that pays off in the end.

All this costs money, sure. But you'll not be out of pocket in the long run. The economics of safety are inescapable: lower insurance premiums; greater efficiency through better working conditions; less time, material, and equipment lost. It's not, "Can we afford safety?," but rather, "Can we afford to be without it?"

*At AGC's Annual Convention:*

Maj. Gen. Lee B. Washbourne, Air Force chief of installations, tells contractors performance studies of rigid and flexible pavements at jet bases led to new pavement criteria.

# Air Force Decides Runway Paving Must Be Concrete

By ROSS HAZELTINE,
Managing Editor

AN AIR FORCE GENERAL dropped a bomb at the 37th annual convention of the Associated General Contractors of America in New York. Maj. Gen. Lee B. Washbourne, assistant chief of staff for installations, told the contractors the Air Force will demand from now on that all primary taxiways and active runways for combat aircraft must be built of portland cement concrete.

"With appropriate exceptions," he said, "it is the Air Force conclusion that concrete can 'take it,' and 'black-top' can't."

Gen. Washbourne said the Air Force had been studying the problem of pavement criteria for runways since it began to operate jet-propelled aircraft about four years ago. "It was immediately apparent that operational problems would result from jet blast, fuel spillage, and extremely heavy aircraft weights on high-pressure tires," he said. "The extent of the problem was not underestimated."

"Weights of new aircraft coming into the inventory are already approaching 500,000 lb, and the operational problem of moving this weight thousands of times with bicycle-type gear over the same area of pavement has not been solved.

"I will not dwell upon certain shortcomings of flexible pavements that have been demonstrated to the satisfaction of the Air Force during this period. More powerful engines and increased angles of attack have confirmed and compounded the operational difficulties with jets that were first demonstrated five year ago . . .

"In the past three years . . . the Air Force has put down possibly 100,000,000 sq yd of heavy duty pavement, half rigid, half flexible; some good, and some not so good. It has been demonstrated that the difference in cost between concrete and 'black-top' has been a minor consideration. The Air Force believes the impact of this criteria upon the petroleum industry and upon large segments of the contracting industry with respect to equipment utilization is much more important.

"It is with great reluctance that the Department of the Air Force establishes this operational requirement, but, with enough pavement on hand to provide a 90-ft taxiway from Washington to Moscow, the Air Force feels that this tremendous capital investment may not be further subjected to uncertainties."

Two other military leaders explained some of the reasons behind the Air Force decision. At a meeting of the Heavy Construction Division, Col. R. R. Conner, Air Force chief of construction, stressed the need for very close surface tolerances.

He said even slight depression in a runway pavement can cause serious trouble. A jet plane, he explained, develops what he called "porpoise action"—a series of bounces—when it lands on an uneven surface, and this sometimes damages sensitive mechanisms in the plane even if the landing is made safely.

"In general," he said, "we will be building in portland cement concrete with slabs 20-in. thick, or thicker, and with higher smoothness tolerances."

And Lt. Gen. S. D. Sturgis, Jr., Chief of Engineers, told a general session of the convention that modern aircraft require "a super deluxe job of design and construction" of runways "The establishment of longitudinal and transverse gradients . . . are not alone enough to insure a satisfactory profile," he said. "It has become necessary to exercise closer control during construction."

Gen. Sturgis made no comment about the relative merits of rigid and flexible pavements, but he emphasized that the Corp of Engineers will require a high degree of precision in future runway construction. *(Continued on next page)*

## Asphalt Spokesman Replies

ARVIN S. WELLBORN, Chief Engineer, The Asphalt Institute, sent CM&E this statement about the Air Force decision to bar the construction of flexible pavement for runways:

"We are aware of the fact that some Air Force spokesmen have indicated a consistently unfriendly attitude toward flexible airfield paving. However, we have been informed by the Corps of Engineers that there is no basis for their charge that a satisfactory pavement cannot be designed and built. It is fairly clear that the Air Force criticism arises from a confusion in the minds of the critics who have not learned to distinguish between old-fashioned asphalt paving designed for World War II-vintage aircraft and today's modern, heavy-duty flexible pavement.

"We have ascertained that flexible pavement distress at Air Force installations is limited to several bases, principally those handling our heaviest bombers. The distress itself has been very limited and spotty. And in virtually all cases, studies have traced the trouble to faulty compaction in the subgrade.

"The Corps of Engineers has established some fundamental findings in preliminary studies. This knowledge is now being applied in the construction of special test sections at Kelly AFB in Texas. We are confident that the scheduled tests at Kelly will be conclusive vindication of flexible pavement for airfield runways."

NEW AGC OFFICERS receive congratulations of outgoing president George C. Koss (center). Frank J. Rooney (right) is 1956 president; Lester C. Rogers (left) is vice president.

# AGC Attacks Industry Problems

CONTRACTORS talked about highway legislation, labor problems, materials prices, bid shopping, and the healthy state of the construction business at the week-long 37th annual convention of the AGC.

They also installed new officers, listened to a long list of prominent speakers, and had a good time. It was a fine convention.

Most of the major problems the convention considered found their way into the series of seven resolutions passed at the closing session. Here are the highlights of those resolutions:

### Contract Method

The convention declared that the nation's general contractors have the capacity to carry out promptly and efficiently all the civilian and national defense construction the U. S. requires. It recommended that contracts for both public and private construction be awarded to the lowest bidder after public advertisement in order to realize the full benefits of the competition which prevails in the industry.

### Highway Program

A resolution urged Congress to enact legislation to meet the urgent need for a greatly expanded highway construction program. It did not go into details about which of the several forms proposed this legislation might take. But it did insist that the goal of an adequate highway system should be reached in "the minimum time consistent with sound planning." And it gave assurances that the highway contracting industry has the capacity to carry out an expanded highway construction program efficiently and in such a manner that the public will receive increasing value for its investment in highway construction.

### Highway Wage Rates

The AGC took a strong stand against inclusion of any provision for federal wage fixing in legislation for an expanded highway construction program. Its resolution said this would tend to increase the cost of highway construction, have a disruption effect on the economies of local communities, lead to increased federal regulation and resulting delays, expense, and interference with operations, and violate rights given the states in the Constitution.

### Highway Officials

A resolution commended the American Association of State Highway Officials and the Bureau of Public Roads for their studies which have demonstrated the savings to the public that are possible when highway maintenance work is let by contract.

### Employer Solidarity

The convention recommended to all member firms that they cooperate with other employers, both nationally and locally, to build greater employer solidarity in the solution of labor problems.

### Industrial Construction

The convention strongly reaffirmed the principle of construction by contract and opposed any compromise of this principle by building trades and production unions or by restrictive agreements between owners and the productive union men they employ. It said the demand by production unions that they be allowed to perform new construction work constituted, in effect, a restraint of trade.

### Firm Materials Prices

A resolution declared that escalator clauses in contracts for the purchase of materials encourage inflation, are not conducive to cost stability, and are not in the best interests of the public. It called on manufacturers and suppliers to quote firm prices good for the duration of each particular project and asked federal, state, and local construction agencies to oppose the inclusion of escalator clauses in their purchase contracts.

### New Officers

Frank J. Rooney, a Miami, Fla., building contractor, took office as president, succeeding George C. Koss, Des Moines, Ia., highway and paving contractor. Lester C. Rogers, Chicago, Ill., heavy engineering contractor, was installed as vice president.

The convention also elected 19 new national directors for three-year terms, and its three divisions —Highway, Heavy, and Building— elected new chairmen and vice chairmen for 1956.

### Highway

Rex M. Whitton, chief engineer, Missouri State Highway Department, and president of AASHO, declared modern highways would save at least 25% of the 38,000 lives lost in highway accidents in 1955. "Our economic loss last year due to inadequate highways," he said, "was at least $4 billion, with no money value placed on the huge loss in life and personal injuries."

He declared a national program, if it is to be adequate, must be both comprehensive and stable. "It cannot be a year-to-year or hand-to-mouth undertaking," he said. "Only a stable and committed program will induce contractors, equipment manufacturers, materials producers, and state highway departments to plan adequately and execute the program properly."

**HIGHWAY DIVISION 1956** chairman Edward O. Earl (second from right) shakes hands with retiring chairman J. L. Ewell. 1956 vice chairman W. Ray Rogers (left) looks on.

### Heavy

Col. William F. Powers, Corps of Engineers, described the handling of reconstruction operations after the battering floods in the Northeast late last year.

He said the Corps of Engineers let 1,601 separate jobs; 400 are still to be completed. At first, some contractors had no contract; others had only letters of intent with no real legal value. Later some lump-sum contracts were awarded, and when the emergency was over, bids were taken on some jobs.

Col. Powers said the response of contractors in these emergency conditions was "tremendous." He praised the fine work they did and pointed out that not a single claim or dispute has arisen.

**HEAVY DIVISION** chairman W. H. De Butts (left) with F. S. Oldt, 1956 vice chairman.

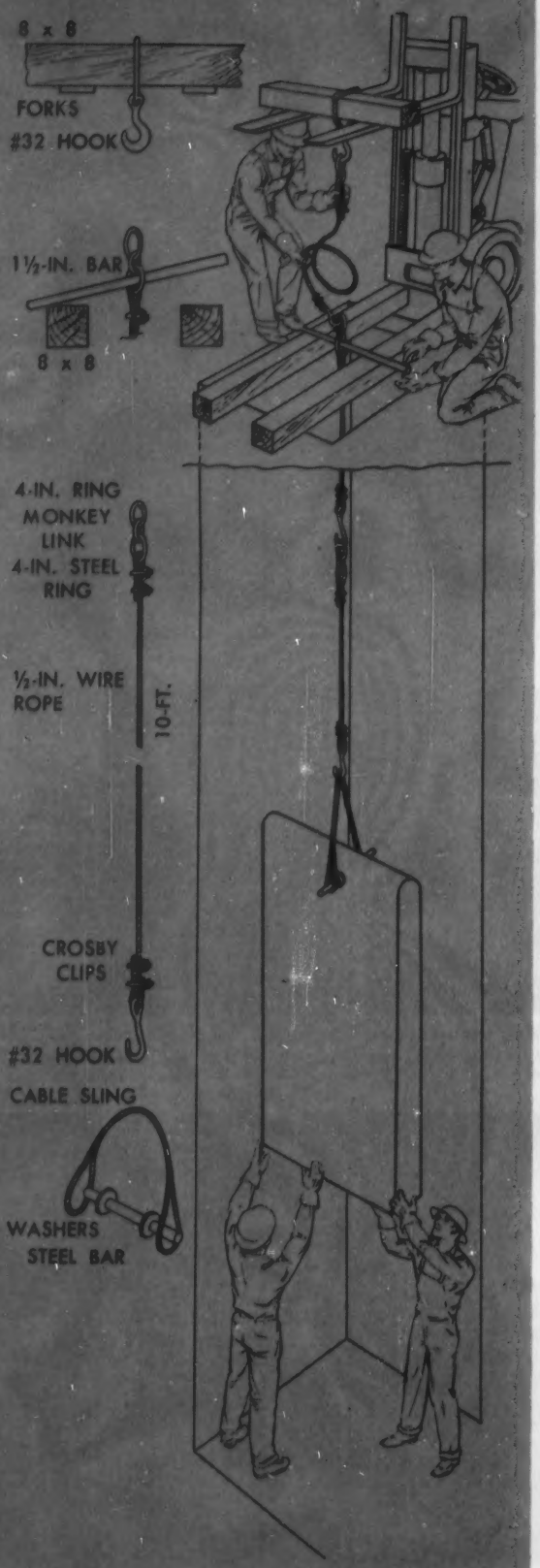
**RETIRING** chairman James Henderson (right) and vice chairman George Loorz.

### Building

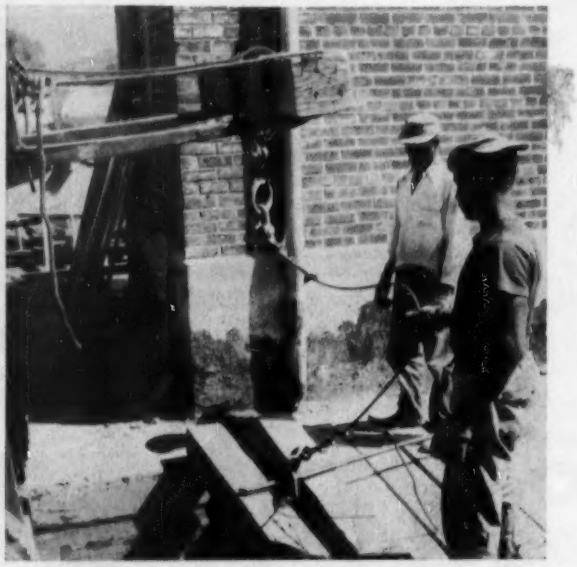
Discussion of subcontractor relations dominated the meetings of the Building Division. Speakers pointed out that Congress probably will act this year on a bill which would require general contractors to name their proposed specialty subcontractors for federal construction projects. The bill— S. 1644 has been passed by the Senate and now is before the House.

The division agreed to oppose the bill strongly on the grounds that it would mean more government control, would be a first step toward destruction of the general contract system, and would hurt small specialty contractors because general contractors would not gamble on their performance. Members were urged to contact their Congressmen.

**BUILDING DIVISION** chairman for 1956 is Earl J. Wheeler (left) who replaces James Cawdrey (second from left). W. A. Snow (right) is division manager at AGC headquarters.



TRUCK'S FORK lowers first section of cable attached to block into 75-ft shaft. Tripod derrick lowers small tools.

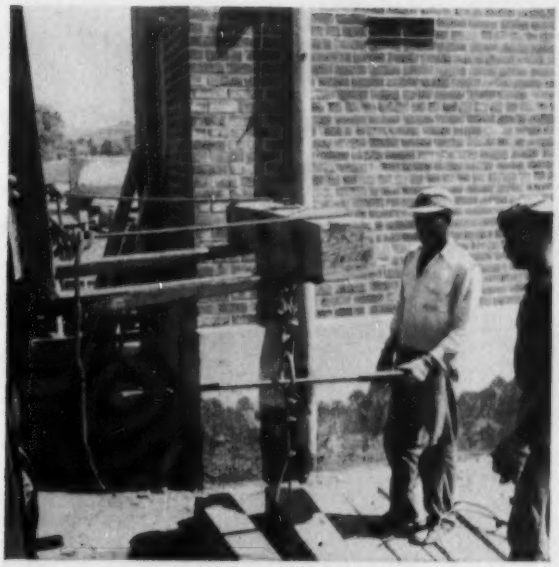


WORKMEN HOOK on second section of cable while arrester bar holds block suspended. Raising fork full height releases bar.

# Fork Lift Truck

A FORK LIFT TRUCK rigged with a series of detachable steel cables is doing the work of a crane at much lower cost on a New York aqueduct job.

Woodcrest Construction Corp. of New York City developed the rig to place precast concrete water-retaining blocks at the bottom of a 75-ft-deep Shaft 19, Delaware Aqueduct, Mt. Pleasant. Using the crane substitute, Woodcrest expects to make a $16,000 profit



ARRESTER BAR is placed through 4-in. ring as truck's fork nears end of section lowering. Bar comes to rest against 8x8's.

BLOCK REACHES bottom of descent, and workman guides it into position on block already placed. Drop takes less than 4 min.

# Subs For Crane

on its $59,000 contract for the job, an official said.

Sounds simple. But working up the system required some imaginative thinking without which, as Woodcrest's Superintendent Edward Good, Jr., put it, the job might have become "a dog."

When Good brought a 5-man crew to Mt. Pleasant to begin work, he had an uneasy feeling about the job. Woodcrest had bid awfully low. Second bidder had asked for $65,000, and other bids ranged as high as $128,000.

The job was a tough one. A 20-ft wall had to be built up at the bottom of the shaft with 75 blocks. Most of them were 17 in. thick, measure 5x5 ft, and weigh 4 tons. Purpose of the wall was to narrow the aqueduct chamber and cut down the 1 billion gal per day flow rate to 800 million gal per day.

Lowering the blocks was clearly a crane job. But rental for the crane necessary would have been $125 a day. This item alone over the four months time required to do the job would cost almost $9,000. A fork lift truck rents for $50 a week.

Good already had a Ross fork lift truck with a 4-ton lifting capacity on the job for other work. He reasoned that if he could use it for lowering the blocks, he could make a substantial saving. But how to do it was a tricky question.

Good huddled his crew in a brainstorming session. (Brainstorming is the art of throwing together wild ideas with the hope of coming up with a gold mine.) The session took a full day's thinking and cost over $100 in lost labor.

"But that $100 expense for brainpower was worth $8,000 to us," Good said.

The result of the huddle was the use of a fork lift truck with a 10-ft rise to lower the blocks in 10-ft drops by the addition of sections of cable slings.

They made the device of four basic parts: (1) The fork lift truck; (2) Detachable cable slings; (3) An arrester bar and braces; (4) A pin and strap assembly by which the concrete blocks could be secured.

An 8x8-in. timber was fitted across the truck's fork and circled by a strap of ½-in. plow steel cable fitted with a No. 32 steel hook to engage the detachable slings.

### How Rig is Used

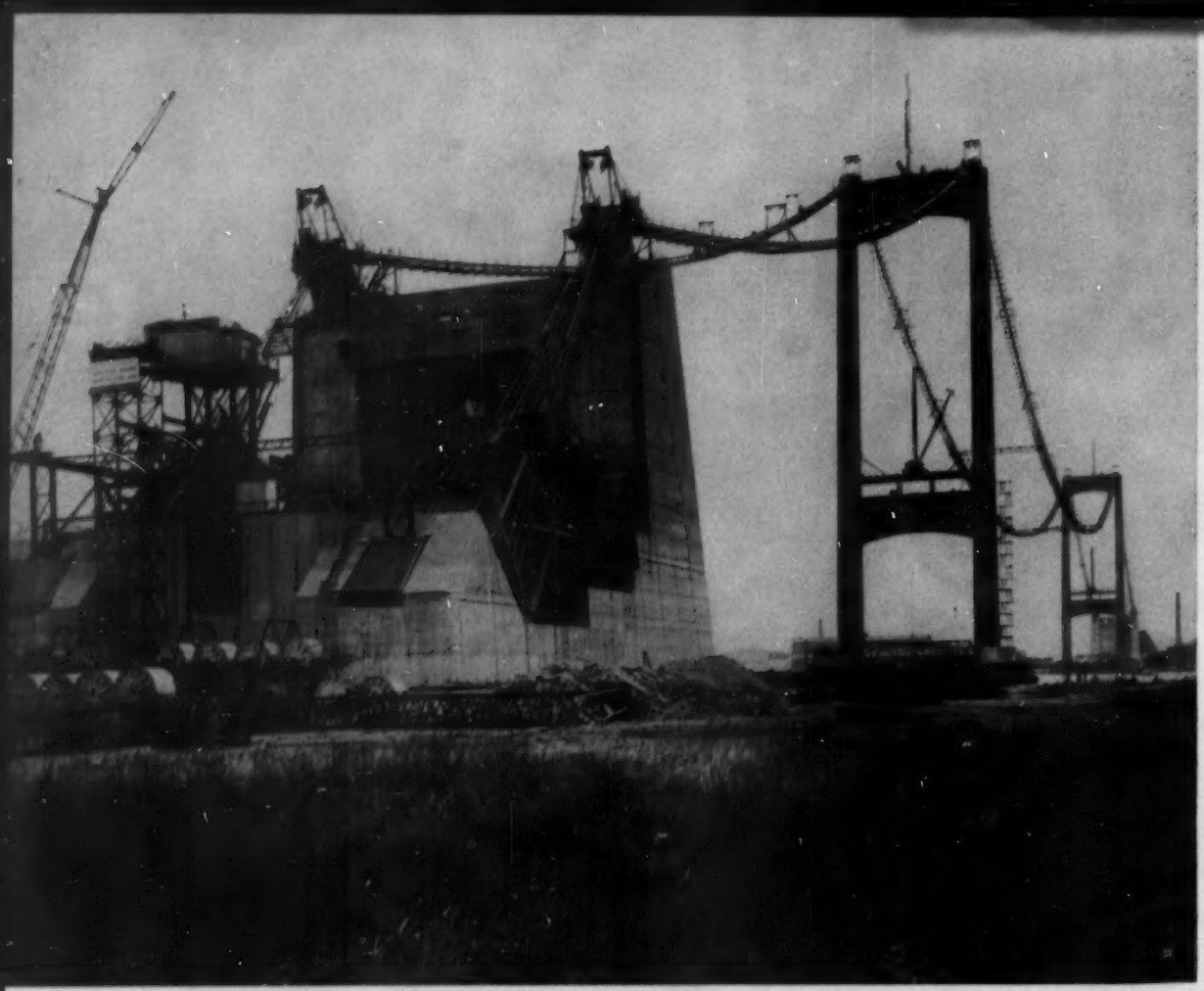
Good used eight slings 10 ft long. The sling was made by fitting to the top of a cable length two 4-in. dia steel rings joined by a monkey link. The bottom end was fitted with another No. 32 steel hook to engage a concrete block or previously lowered section of cable.

Each block was cast with a sleeve at its top. Good ran a steel pin through the sleeve and fitted on a steel cable strap to provide a means for securing the block to the cable sling.

The arrester bar came into play after a cable section was lowered. The bar was 3 ft long and ½ in. thick. A laborer ran it through the lower of the two rings at the top of the cable and let the bar brace against two lengths of 8x8-in. timbers placed across the well opening.

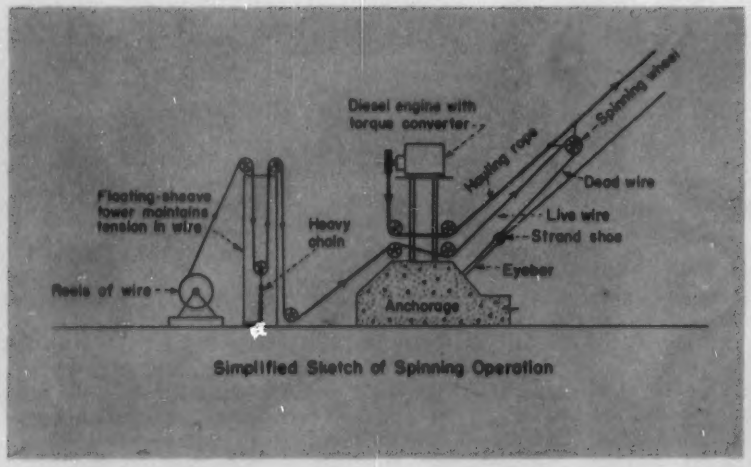
Then the fork was lowered a few inches to take the tension from the cable. While the steel bar held the block suspended in the shaft, a workman disengaged the hook from the cable sling. The fork was again lifted to within a few inches of its full height, and another worker hooked an additional section of cable to the top ring on the sling. Lifting the fork to its full height returned the tension to the cable. This removed the load from the arrester bar which was withdrawn. The block then was lowered another 10-ft length.

Two men received the blocks at the bottom of the pit, and two men handled the slings and arrester bar. Each 75-ft lowering took less than 4 min. Good also used a 2-ton capacity Clark fork lift truck on the job for miscellaneous lifting.



**PARTIALLY COMPLETE** anchorage supports cable saddles on buttresses. Eyebars for anchoring splayed cable strands are embedded in blocks of concrete. When spinning is completed, curtain walls will enclose anchorage. Note rack of wire reels and compensating sheave tower. Shed houses engine which powers hauling rope. Spinning equipment is duplicated on other side.

# How to Spin a Pair of Suspension



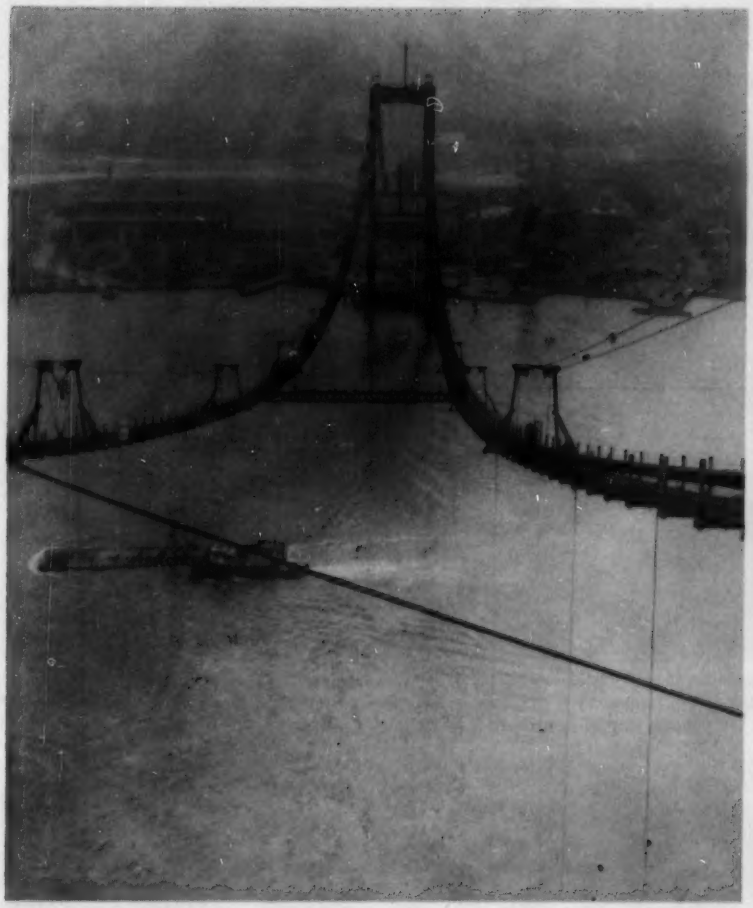

Simplified Sketch of Spinning Operation

By ALBERT C. SMITH
Associate Editor

HOW DO YOU convert a few hundred reels of wire into a pair of suspension bridge cables? You simply pull one loop after the other across the span, lay them parallel, adjust to a predetermined sag, and then compact into a neat, round bundle.

Basically, that's all there is to it. The method is the same now as it was 102 years ago when John Roebling spun his first bridge cable at Niagara Falls.

But a lot of tricks have been developed since 1854. Modern ca-



**AERIAL CABLE** spinning high over Delaware River progresses 16 hr per day. Hauling rope reeved through tops of gallows bents on footbridges pull spinning wheels back and forth. Arched ropes with vertical ties under footbridge prevent undulations.

## Erecting Footbridges

THREE 2¼-in. wire ropes are hoisted between main towers to support footbridge. After spinning, ropes are cut into suspenders from which deck trusses hang.

BUNDLES of fencing with 6x8-in. floor beams attached are lifted to platform. Beams are connected to ropes, and fencing is allowed to slide down of its own weight.

FENCING for side-span footbridge is pulled up to tower from anchorage. Pieces hanging from beam ends bolt upright as handrail posts, and carry power lines.

# Bridge Cables

ble spinning is fast, efficient, and accurate. Equipment is more reliable, and men have the know-how. But a crew with more than a few suspension bridges under its belt is rare. Only a few firms, like American Bridge Div. of U. S. Steel Corp., has trained men. And they're kept busy. Within a month or two they will wind up operations on the Walt Whitman Bridge at South Philadelphia and move intact to the Straits of Mackinac Bridge in northern Michigan.

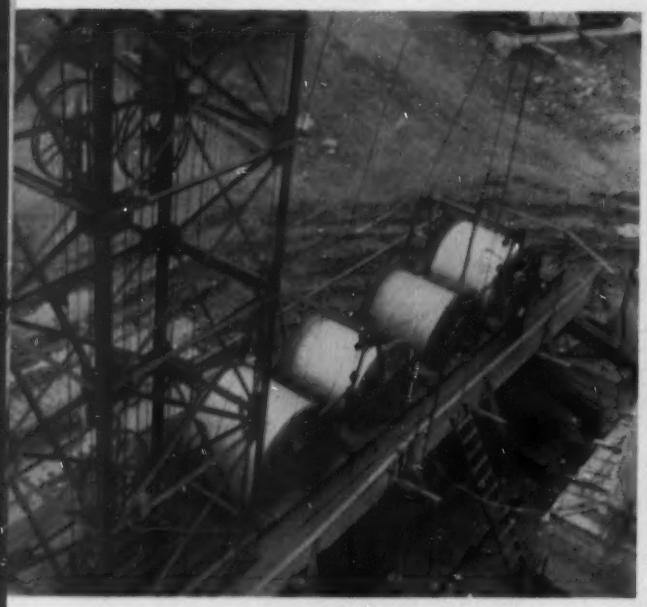
Right now their main concern is keeping loops of wire for the Walt Whitman Bridge crossing the Delaware River 16 hours a day. It's not the biggest spinning job on record, yet they are probably laying more wire per man than ever before.

The bridge has a main span of 2,000 ft and two side spans of 770 ft. From anchorage to anchorage two identical cables 23½ in. in dia will stretch 3,840 ft. Each consists of 11,396 hot-dip galvanized steel wires 0.196 in. in dia. Made by American Steel and Wire Div., the wires are spun into 37 strands. Each strand is 3⅞ in. in dia and carries 308 wires.

### Footbridges

Spinning crews moved in on the job last fall as soon as the towers and anchorages were ready. Their

## Spinning Wheel is Key Unit



**1.** RACK contains eight reels. Wire passes over top of compensating tower (left) and around weighted floating sheaves that maintain constant tension. Sheaves actuate brake bands on reels.

**2.** LOOP of wire is placed around grooved spinning wheel at anchorage. One part of wire, called dead wire, runs around shoe and into strand. Other part, called live wire, runs to reel.

**Suspension Cables . . . Continued**

first job was to erect the footbridges on which the cables are strung. As usual the footbridges were supported on wire ropes that would be cut up after spinning to serve as suspenders.

Erecting the footbridges was a fast operation. The 2¼-in. wire ropes were hoisted in three sections—one for the main span and two for the side spans. The side spans were easy. A small guy derrick atop each tower hoisted one group of ends to saddles on top of the tower where they were locked in place. The other ends were locked into the anchorage.

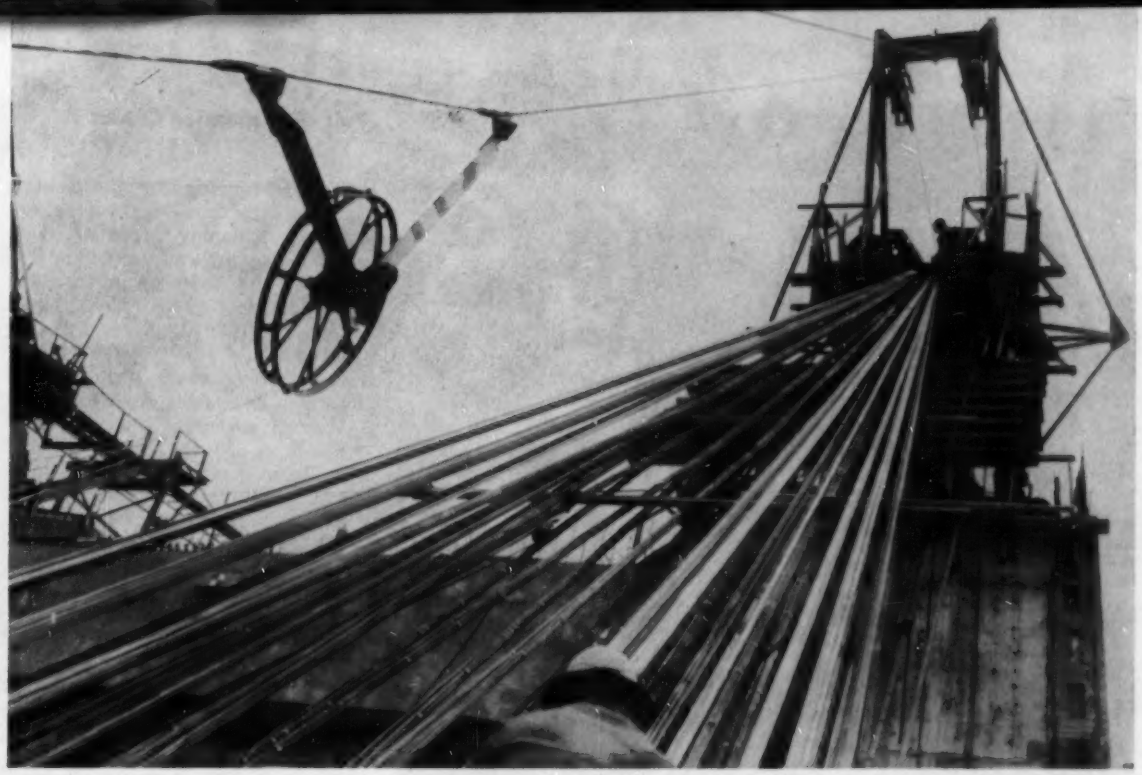
On the center span big reels mounted on a barge played out rope into the river as the barge was towed across. Ropes were then hoisted to the saddles one end at at time and locked in place.

With three ropes in place for each footbridge, the next job was to place a lightweight decking of chain-link wire fencing under the ropes. Fencing was first prefabricated in 100-ft lengths 9 ft wide, and 6x8-in. floor beams were attached 10 ft apart underneath.

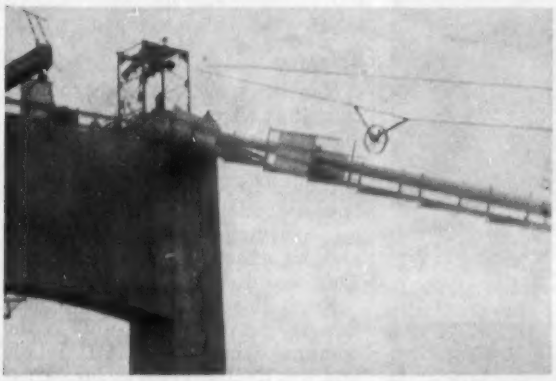
On side spans, fencing was pulled up the ropes from anchorages to towers. Connections at the ends of floor beams slid on the ropes.

*(Text continued on page 62)*

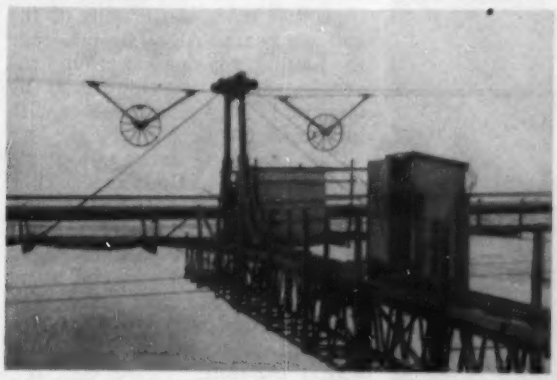
**3.** EYEBARS anchor splayed strands as spinning wheel begins long trip with two loops of wire. Note slotted holes between top and bottom eyebars (left), where completed strands are adjusted. Jack releases top eyebar and shims are removed.



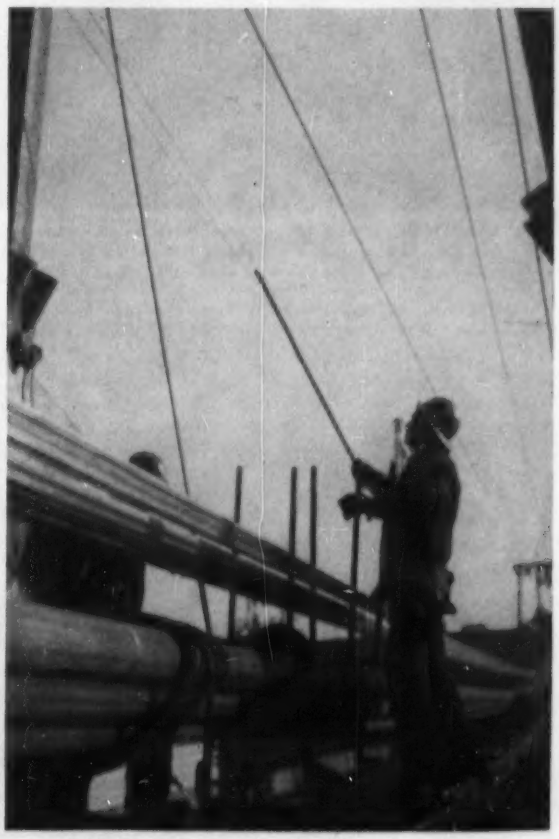
**4.** SPINNING WHEEL picks up speed and heads for cable saddle on anchorage buttress. At each anchorage, endless hauling rope passes around reversible-drive sheaves powered by General Motors diesel engine with Twin-Disc torque converter. One operator controls both engines. Anybody on footbridge can stop spinning wheel, but only engine operator can start it.



**5.** HIGH POINT of climb is reached at top of tower and spinning wheel descends over main span. Hauling rope curves through bank of sheaves in steel gallows frame on tower top.



**6.** PAIR of spinning wheels moving 650 ft per min in opposite directions passes at mid-span. Man in booth on crossbridge records data on each work stoppage. Panel of lights locates wheel.



**7.** WORKER pulls down wires behind passing spinning wheel, places dead wires under floor hooks and live wires under sheaves. This prevents swinging of wires and keeps them sorted.

**8.** DEAD WIRES coming off bottom of wheel at anchorage saddle are placed directly into strands. Live wires are dropped into slotted guides until wheel stops and loops are placed over shoes. Note live wires from other wheel in slotted guides.

**9.** LOOPS are removed from wheel and placed around strand shoes. Live wires from wheel's previous trip, now reeved under strand shoes, are looped over grooves. Wheel begins return trip. Note cowbells on wheel spokes for warning workmen.

## Pair of Suspension Cables

Placing fencing for the center span footbridges was tougher. Bundles of fencing were hoisted to temporary platforms erected at the tops of the towers under each group of three ropes. From here, workmen bolted the floor beams to the ropes and allowed the fencing to slide down of its own weight. This was done from each tower.

When the fencing was in place, cross bridges were placed at the center and quarter points. To stiffen the footbridges against undulating motion, pairs of arched ropes under each footbridge were connected to the ropes with vertical ties.

But more work was needed on the footbridges. Timber gallows bents for supporting an endless hauling rope were erected on top of each tower and 200 ft apart along footbridges. Hand-rail posts which had been hanging from the ends of the fencing floor beams were turned up and bolted in place. They now carry ½-in. wire rope hand rail, and electrical cables for lights, signals, power control, and telephone.

## Spinning

Now the crew was ready to start spinning wire. Racks mounting eight reels of wire were set up behind each anchorage. One wire was pulled completely across to the opposite anchorage and adjusted by surveying instruments until it had an exact predetermined sag. This was the guide wire.

From this point on, the operation is identical. Key unit is the spinning wheel. It is 4 ft in dia and has double-grooves for carrying two loops of wire. The spinning wheel is permanently attached to a ⅞-in. endless hauling rope that rides in the tops of the gallows bents. At each anchorage the hauling rope passes around reversible-drive sheaves driven by General Motors diesel engines with twin-disk torque converters.

Two spinning wheels are attached to the hauling rope. They always move in opposite directions. On each trip, they start simultaneously at opposite anchorages, meet at mid-span, and end up at opposite anchorages. Together, they lay eight wires for each 7½-min trip across. Maximum speed is 650 ft per min.

To understand the role of the spinning wheel, follow the path of a single wire. It starts at a reel

## Adjusting Sag of Wire

ADJUSTING is done at middle of side span. Using push button, observer signals to come-along operator on tower who pulls or slacks off until wire has proper sag.

COME-ALONG operators on tower adjust wires for both main and side span. Bell signals are controlled by men at mid-spans. Once adjusted, wire is clamped to prevent slipping.

behind the anchorage, passes through a floating-sheave tower that maintains constant tension, and then runs up to the anchorage. If the wire is not moving, it means that a spinning wheel has just pulled it across to the opposite anchorage and is now returning with a loop of wire from the other side. When the wheel arrives, workmen remove the loop and place it around a strand shoe mounted at the end of an eye bar embedded in the anchorage.

The non-moving wire is then looped around the spinning wheel. One part of the wire will be dead —running around a shoe and into a strand. The other part will be live—running back to the reel.

The hauling rope starts, and the spinning wheel begins to pull wire from the reel. It picks up speed and moves up toward the first tower. Every time it passes a gallows bent, workmen catch the dead wire by hand and place it under a hook on the floor of the footbridge. Then they pull down the live wire and place it under a sheave alongside the hook. This prevents dangerous swinging of the wires and keeps them sorted. This operation is repeated all across the span. If anything goes wrong, the wheel can be halted immediately by push buttons located all along the footbridge.

### Adjusting

But that's not all the footbridge men have to do. The wire must be adjusted to the proper sag. And adjusting follows right behind the wheel. As soon as the wheel passes the first tower, the dead wire is removed from the hooks on the footbridge. An observer at the center of the side span then determines how much adjustment is needed in the dead wire to give it exact sag. Using push-button signals, he directs a man on the tower to move the wire back and forth with a come-along. As soon as the adjustment is made, the wire is clamped at the tower to prevent any slipping.

This operation is repeated all along the cable. When the wheel arrives at the opposite anchorage, the loop is removed and placed over a strand shoe. A new loop is wrapped over the wheel, and it starts on a return trip. The live wire from the previous trip is then adjusted.

Essentially, that's how one wire, in the form of a loop, is spun across the span. Actually, the double-grooved spinning wheel pulls two loops at once. With one spinning wheel in each direction, eight wires are laid per trip. Production averages 6½ tons of wire per hr. Crews work two 8-hr shifts a day.

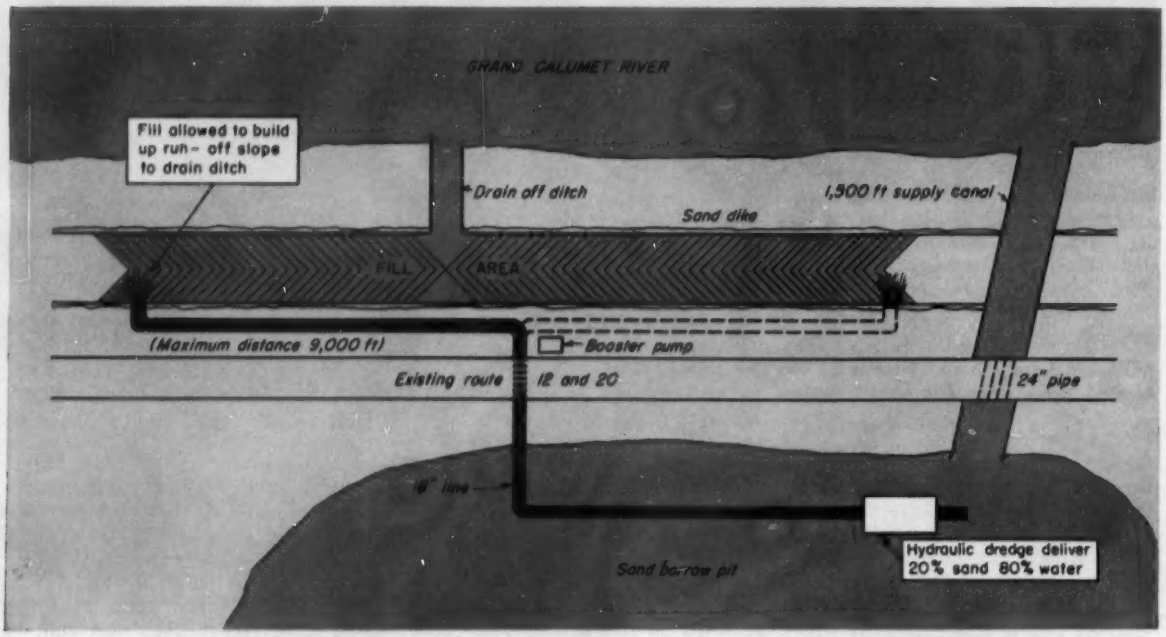
Four strands are spun at the same time. When they are completed, the beginning and final ends of each strand are spliced, making a strand a continuous wire.

The spinning crew then shifts to the other cable while an adjusting crew works on the four completed strands. Metal bands are placed 5 ft apart on each strand. Adjustments are then made on the strand. It's done at night to assure uniform temperature. Strands are lowered on to the main cable by removing shims from slotted holes in the eyebars and then jacking the strand shoes forward.

When all 37 strands are spun in each cable, they will be compacted into a circular cross-section. Bands will then be applied and suspenders hung. As soon as the deck is erected and the cables reach their permanent sag, they will be wrapped with galvanized wire.

A. B. Drilling is superintendent, and D. B. Rees is field engineer for American Bridge Div. of U. S. Steel Corp.

**HYDRAULIC DREDGE** equipped with Morris pump powered by 1,000-hp motor supplied fill for section of the Indiana Toll Road from a flooded borrow area. To flood sand pit, a 1500-ft canal was opened from the Grand Calumet River. At longest point, the 18-in. discharge line carried 9,000 ft. Another Morris pump served as a booster at this distance. Dredge pumped 20% sand, 80% water. To contain water until sand settled, dikes were constructed by two crawlers. Water was drained off through ditch leading back to the Grand Calumet River.




**THE 12-MI SECTION** from Hammond to Gary is a tough and expensive job. Construction costs for the entire Indiana Toll Road are estimated at about $150 million; construction costs for this section alone are estimated at $41 million. Better than 54 mi of piling will be required to support the 64 bridges scheduled for the section. Extensive railroad and big pipeline relocations also complicate the job. Engineers for this section are a joint venture of Richardson, Morehouse, Ramsey, and Fisher, of Pittsburgh; Moran, Proctor, Mueser & Rutledge of New York City; and Harry A. Balke of Cincinnati. J. Paul Ambler is project manager, and Willis A. Bryan is project engineer.

### As Cold Weather Threatens:

# 900,000-yd Road Fill Placed By Dredge

RACING against cold weather, the Missouri Valley Dredging Co. used a hydraulic dredge to place more than 900,000 yd of fill for a section of the Indiana Toll Road. When freezing weather finally shut down the hydraulic fill operation, Missouri used the dredge to pump the borrow pit dry and hauled the 300,000 yd still needed with Euclid bottom dumps.

Although local conditions indicated a hydraulic fill operation would be practical and economical if the weather stayed above freezing, Missouri was bucking the odds by starting the job in September in an area where cold winters are usual.

Despite the threat of temperatures that woud freeze the fill and make compaction impossible, the

prime contractor, a Peter Kiewit-Condon-Cunningham joint venture, decided on the hydraulic fill.

First of all, it is an economical operation when the weather is right and when sand and water are available in large quantities. Within 1,500 yd of the roadbed, both sand and water were available. The Grand Calumet River runs parallel on one side of the roadway, and a large sand pit was available on the other.

Then, there is a busy highway between the borrow area and the fill area. Scrapers and wagons would have to cross this highway to get from the borrow pit to the fill area.

To flood the borrow area, Missouri dug a 1,500-ft supply canal from the Grand Calumet River through the toll road area and piped water under the highway to the borrow pit. The canal's flow was carefully regulated so that the pit was flooded just enough to meet the day-to-day requirements of the hydraulic dredge. Near the end of the operation, however, the flooded area covered several acres.

Missouri's dredge was equipped with a Morris hydraulic pump powered by a 1,000-hp Westinghouse electric motor. Since the fill was composed almost entirely of beach sand, screening was not a problem, and the discharge line seldom clogged.

The 18-in. discharge line was extended under the existing highway and up to the fill area. Between the highway and the fill area, another Morris pump, serving as a booster, was moved to various points along the discharge line as the line was shortened or lengthened.

It was necessary to move the discharge line only four times during the operation. At its longest point, the line ran 9,000 ft to the extreme end of the fill area.

The dredge delivered 20% sand to 80% water. To prepare the fill area so that it would contain the water until the fill settled and then could be easily drained off, Caterpillar D8's were used to construct sand dikes. These dikes were built up gradually as the fill rose.

As the discharge line flooded the diked area, the settling fill formed a natural slope from the point of discharge. When this slope reached a point where grading was a problem, the discharge pump was moved down the roadway, and a reverse slope was allowed to build up. The water drained down the V formed by the two slopes and ran off through a ditch leading back to the Grand Calumet River.

Ease of compaction is another advantage of a hydraulic fill. The

**HYDRAULIC FILL . . .**
**Continued from page 65**

water that carries the fill also serves to compact it. In this case, the Caterpillar D8's that had built the dikes were tracked across the area to grade and compact the fill. This was all the additional compaction necessary, but parts of the fill also were rolled with a Ferguson 50-ton roller.

Since the dikes were constructed of sand, leaching did prove a problem. Keeping the banks dressed was a full-time job, handled by a Northwest 80D dragline and Caterpillar D8's.

Missouri used its dredge to place an average of 10,000 yd per day. It was shortly after Christmas that freezing weather brought a halt to operations by preventing adequate runoff of water. Because the sand retained too much water, compaction was not sufficient.

There was still plenty of good fill in the borrow area, but now it was under water. Missouri closed off the supply canal from the Grand Calumet River and used its hydraulic dredge to pump the borrow area dry. When the pit was dried out, two Northwest 80D draglines moved in to load a fleet of six Euclid bottom dumps. In this manner, 300,000 additional yards of sand were moved to complete the 1,200,000-yd fill operation.

Leo Donalson is project manager for Peter Kiewit - Condon - Cunningham.

**1** SOLIDIFIED SLAG BANK, used for 30-yr by steel mills as dump area, had to be scarified with ripper drawn by Allis-Chalmers HD21 and then dozed by crawlers.

**2** BUCYRUS-ERIE 120B electric shovel loads Euclid 17-yd wagons. The 6½-yd shovel gets heaped load by biting into bank, coming up on slag piled by crawlers.

## *Lightweight Slag Proves Good Fill, But Hard to Dig*

OBTAINING FILL was a problem all along the 12-mi stretch of the Indiana Toll Road between Hammond and Gary. Less than a mile from Peter Kiewit-Condon-Cunningham's job, the W. E. O'Neil Construction Co. needed 800,000 yd for its 1-mi job.

Because the only available dirt fill would have to be trucked in from several miles away, O'Neil decided to borrow from a near-by blast-furnace slag bank that had been used as a spoil area by surrounding steel companies for 30 yr.

Critics advised against the operation, citing the length of time the slag had had to solidify and pointing out that waste metal deposits (ladle bottoms and melting pots) would have to be removed from the fill.

Digging the fill and removing the metal did present problems, but once the slag was loaded into bottom dumps the fill proved lightweight and easy to handle and compact. After the fill was placed, an unexpected advantage helped offset the initial difficulty in digging the slag. When wet weather hit the area, O'Neil found that the lightweight slag held up much better than sand or dirt fills could be expected to under similar weather conditions.

All in all, O'Neil found the slag fill compared favorably with dirt fill obtained under the same circumstances, and was a much cheaper operation than trucking dirt fill from a great distance.

To dig the slag, O'Neil brought in a 6½-yd Bucyrus-Erie 120B electric shovel that had been used on the Mesabi Iron Ore Range. The bank was first scarified with long-shank rippers drawn by Allis-Chalmers HD-21's and the loosened slag was dozed by several Allis-Chalmers HD-24's, Caterpillar D-8's and one D-9.

The crawlers piled the loosened slag for the big shovel, which obtained a heaped load by biting into the solidified bank and then coming up on the stock-piled scarified slag. All during the digging, several crawlers stood by, keeping slag stockpiled on top of the bank.

O'Neil's hauling fleet consisted of four straight 17-yd Euclid bottom dumps and four 30-yd Euclid bottom dump wagons hauled

*(Continued on page 69)*

# ANOTHER TEST— ANOTHER WIN FOR NEW CAT* LOWBOWL SCRAPERS!

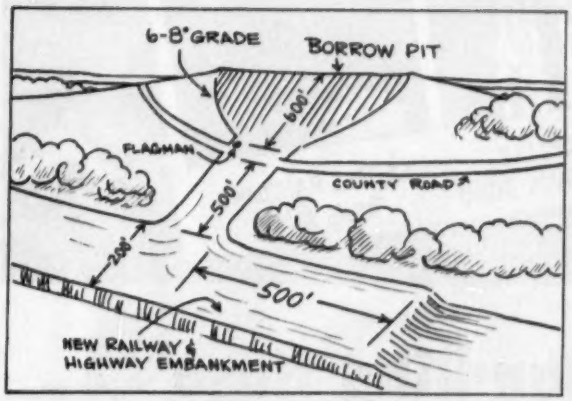
**FIRST** in loading tests on the Kansas Turnpike against six competing scrapers, including one noncurrent DW21-No. 21, which was runner-up!

**FIRST AGAIN,** against two DW21-No. 21s, in tests in Iowa!

*Test after test in the field proves* the ability of the new Cat DW21 (Series C)-No. 470 LOWBOWL Scraper to deliver bigger, faster loads than competing scrapers — including the unit it succeeded, the DW21-No. 21. Here's a recent test made in Iowa. Look it over—see how Caterpillar's exclusive LOWBOWL design pays off in bigger production on the job!

Complete details of this and other on-the-job tests are carried by your Caterpillar Dealer's salesmen. Ask him to show them to you.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.




## DESCRIPTION OF TEST

**JOB AND LOCATION:** Highway and railroad relocation near North Liberty, Iowa, involving 600,000 cu. yd. of fill. Contractor: The Stewart and Rank Construction Co., Bettendorf, Iowa.

**CONDITIONS:** ***Material*** — wet-damp gumbo and red glacial clay mixed with gravel. ***Loading conditions*** — borrow area with 6 to 8% favorable grade, Cat D8 Tractor used for pusher. ***Haul distance*** — 1600 feet. ***Return distance*** — 1600 feet. ***Grade*** — 600 feet of 6 to 8% favorable grade out of borrow area, remainder negligible. Return same route.

| AVERAGE CYCLE TIME: | DW21-No. 470 LOWBOWL Scraper | DW21-No. 21s |
|---|---|---|
| LOAD | 1.00 min. | 1.02 min. |
| HAUL | 1.40 | 1.65 |
| DUMP | .69 | .60 |
| RETURN | 2.51 | 2.88 |
| Total no-delay cycle time | 5.60 | 6.15 |
| Wait and delay time (average of all units to facilitate comparison) | .70 | .70 |
| **TOTAL CYCLE TIME** | **6.30** | **6.85** |

**COMMENTS:** Though the DW21-No. 470 LOWBOWL Scraper carried larger loads, the combination of its turbo-diesel horsepower, highly efficient power train and big, wide-section tires gave the unit a 14% advantage in cycle time.

In the dump area, its power, traction and flotation really paid off. Noncurrent models often had to be pushed while unloading — the new machine seldom required pushing.

## RESULTS OF IOWA TEST

| | DW21-No. 470 LOWBOWL Scraper | Noncurrent DW21-No. 21s without sideboards |
|---|---|---|
| Average load in bank cu. yd. | 18.9 | 15.5 |
| Total average cycle time on 3200-ft. round trip | 6.30 min. | 6.85 min. |
| Trips per hour | 9.5 | 8.8 |
| Production in cu. yd. per hour | 180 | 133 |

**LOWBOWL ADVANTAGE** in bank cu. yd. per hour: **47**

**NEW CAT DW21 TRACTOR-NO. 470 LOWBOWL SCRAPER** New Turbo-charged 6-cylinder Cat Engine packs 300 HP at 1800 RPM. Scraper capacity is 25 cu. yd. heaped, 18 cu. yd. struck. Exclusive LOWBOWL design loads more material faster because of less loading resistance. And new advance-design, wide-section tires are standard equipment. These tires give better flotation and traction in soft going.

**CATERPILLAR***

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**BIGGER, FASTER LOADS WITH CAT LOWBOWL SCRAPERS**

# This Easiest Handling Hose Gets More Work Done–Cuts Labor Costs

Bulk and stiffness have been engineered *out* of this modern hose. The unique construction of Homoflex Hose makes it light, flexible as a rope, yet strong. Made with no pre-set twist, it coils and uncoils *without* kinking. Exclusive R/M engineering creates a homogeneous cover, strength member and tube that are virtually inseparable . . . This hose is easier to handle, yet strong and safe for the toughest jobs!

Homoflex Hose is easier to couple, too, because it has uniform inside and outside diameters. All these features mean that Homoflex Hose lasts longer, gets more work done, handling air, water, other fluids and gases. Ask the R/M representative to show you how Homoflex Hose and other types of R/M hose for general and special purpose use do a better job, longer . . . give you "More Use per Dollar."

RM-612

RM

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

**RAYBESTOS-MANHATTAN, INC.**

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

## HYDRAULIC FILL . . .

**Continued from page 66**

by Caterpillar DW20 tractors.

"The combination proved to be the best hauling unit we've ever had," says O'Neil's project manager, Andy DeSimon. "We've always liked the Cat tractor and we like the flat, wide bottoms of the Euclid wagons." To use the Caterpillar tractor with the Euclid dumps, O'Neil's master mechanic modified the yoke arrangements.

HD-24's and D8's were used to speed the fill. They also dug out the metal melting pots and ladle bottoms that had to be removed before the fill could be compacted. From time to time the stockpiled metal was loaded into a bottom dump returning to the slag bank. There, it was sorted out by magnet and sold as salvage.

**3** "BEST HAULING UNIT we've ever had" is project manager's description of Euclid 30-yd bottom-dumps and Cat DW20 tractor. Modified yokes allowed hook-up.

**4** CAT D9 SPREADS FILL, piles pieces of melting pots and ladle bottoms that had to be removed before slag was compacted.

**5** LETOURNEAU-WESTINGHOUSE tandem rollers, ballasted with concrete, are drawn by Allis-Chalmers HD24 to compact slag.

**6** METAL REMOVED from slag is hauled back to borrow area, separated by crane equipped with magnet and sold for scrap.

*Heaping load on the bulldozer is easily handled by the Turbocharged D9. Notice all-around visibility from operator's seat—also easy access to controls.*

# D9 SETS PRODUCTION PACE CROSSING ON SECTION 33, MASSACHUSETTS

A bid of $4,719,719 on Section 33, Massachusetts Turnpike, won the contract for J. F. White Contr. Co., Cambridge, and Consolidated Constr. Co., Attleboro, Mass. Among other work, specifications on this 3.89-mile section called for excavating 1,720,000 cu. yd. of earth, 46,100 of rock and 231,800 of peat, as well as handling 507,800 cu. yd. of borrow and 205,000 of gravel.

In the equipment line-up, there was a fleet of Caterpillar units including a D9, four D8s, two No. 90s, one D6, four DW21s, a No. 12, a No. 212, a D337 and two D13000s in draglines. Here you see the Turbocharged CAT* D9 Tractor with No. 9S Bulldozer pushing fill into a peat bog.

On this well-planned operation, seven scrapers hauled the fill to the D9. Making round trips of about 4500 feet, the wheel-type DW21-No. 21 Scrapers averaged 15.4 pay yards a trip. On shorter hauls, the crawler-drawn No. 90s averaged 22 pay yards a trip. During its 10-hour day, the D9 set such a fast pace for the scrapers that only occasionally was it necessary to have another 'dozer lend a hand with the fill.

For jobs that call for top production, you can't beat the dirt-moving capacity of the giant D9. For complete facts about the new king of the crawlers, see your nearby Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

**CATERPILLAR***

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THE D9—NEW KING OF THE CRAWLERS

# PEAT BOG TURNPIKE

## BIG PRODUCTION FEATURES OF THE D9

### First Track-Type Tractor with Turbocharger

*The D9's Turbocharger is driven by engine exhaust, utilizing energy which would otherwise be lost. It packs air into the engine according to engine load, not engine speed, for more working horsepower.*

### Choice of Torque Converter or Direct Drive

*To match the tractor to your job, two types of drive are available: the exclusive Caterpillar Oil Clutch with six-speed transmission (both in forward and reverse) or a three-stage torque converter with three gear ranges.*

### Completely New 286 HP Engine

*The powerful D9 Engine features, in addition to the Turbocharger, a 6¼" bore and 8" stroke and runs at 1200 RPM.*

### Constant Power Drive for Rear-Mounted Equipment

*Power for cable controls, direct from the engine's rear power take-off, makes operation completely independent of flywheel clutch or torque converter, boosts operating efficiency.*

### Easy to Operate

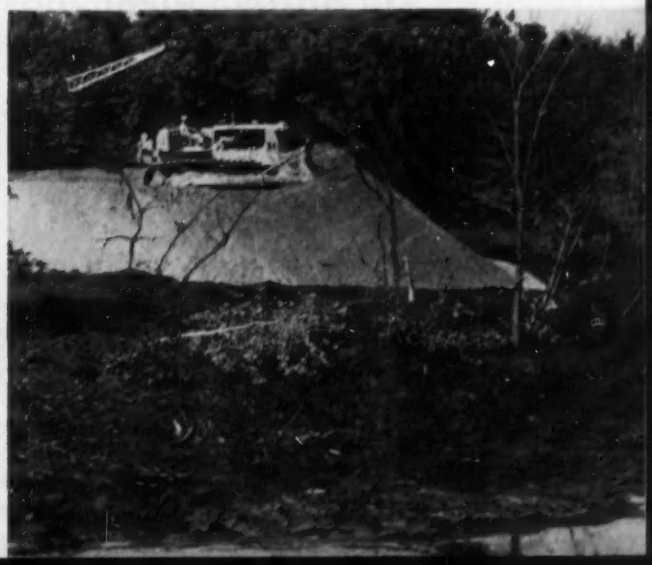
*Hydraulic boosters provide power for steering and braking and master clutch operation. The 7-roller track frame provides excellent stability, flotation and ride. The starting engine has an electric starting system and simple single-lever control for easy and convenient operation from the seat. Fast, sure starts in any weather.*

### Easy to Service

*Oil clutch, torque converter, transmission and steering clutches can each be removed individually without disturbing other components. Hydraulic track adjusters are among the many other features for fast, easy adjustment.*

*Almost singlehanded, the D9 handles all the fill brought up by seven scrapers on Section 33, Massachusetts Turnpike, near Framingham.*

*Back of the D9, a dragline powered by a Cat D337 Engine scoops peat from bog.*



A SUCCESS—New combination trench-sweeping and cable-laying sled completes its run under New York's Harlem River. The sled, which was developed by Consolidated Edison Co. at a cost of $6,000, makes possible a new combined sweeping-laying method.

# Underwater Sweeper Sets Cables

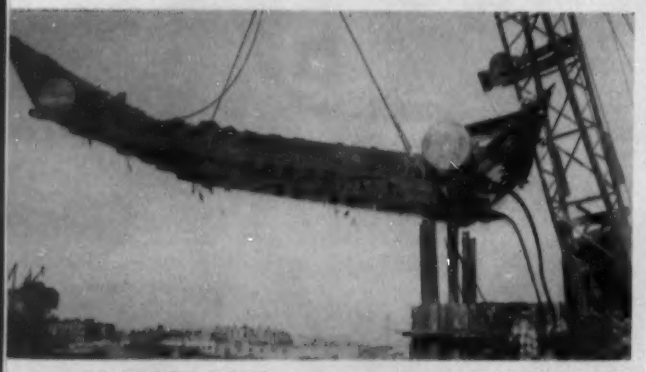
A COMBINATION trench sweeper and cable-laying sled is making possible the development of new underwater cable-laying techniques.

Developed at a cost of $6,000 by Consolidated Edison Co., the tool was assembled and used for the first time by Samuel Gallucci & Son, general contractor, under New York's Harlem River. The sled simultaneously:

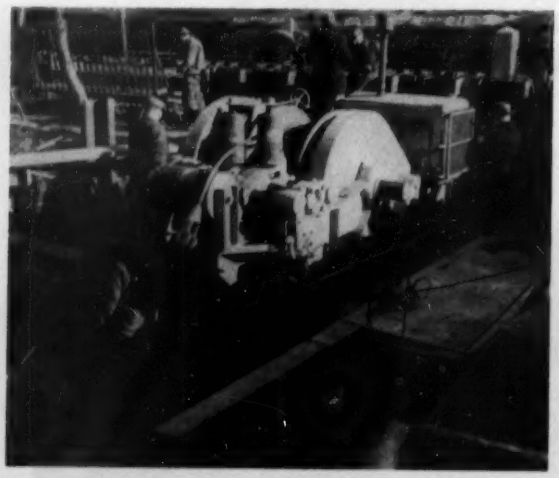
- **Sweeps irregularities from an underwater trench bed**
- **Accurately spaces pull cables permitting the pulling of five 14-in. dia electrical conduits in a single crossing.**

Normally cable trenches aren't swept. But irregularities in trench bottoms prevent the accurate laying of more than two cables in a single crossing. This was to prevent lines from coming accidentally

## *New Rig Used First On Harlem River Job*



CRANE LIFTS SLED from water as cofferdam (rear) is opened to permit running through of five cables just dragged across river.



WINCH SUPPLIES POWER to drag sled across river. Winch base serves as anchor for pull cables. Rig is single-drum, Navy issue.

CABLES LAID during sled's crossing sit properly spaced in shackles welded to cross bar on steel sheet piling cofferdam. Sled launching took place on this bank of river.

together and burning out because of heat generated by the high voltage of the lines. The sweeper provides a smooth bottom that permits greater control of cable spacing. This makes possible the adding of three more lines to a crossing.

Steel blades fore and aft, 16 ft 6 in. long and 3 ft high do the sweeping while 20-in. dia cylinders welded behind the blades provide bouyancy control. Cylinders can be filled with water when weight is desired or left empty for lighter sweeps. The sweeper's two blades are spaced 24 ft apart. They are separated by three steel T-beams to which they are welded.

Purpose of the blade is to sweep a trench while laying, properly spaced, five pull cables. Each pull cable later is used to pull a winch cable across the river. Each winch cable, in turn, drags across one of the five electrical conduits.

Prior to making the sweep a 25-ft-wide, 8-ft deep trench is dredged across the river connecting two 25x30-ft steel sheet piling cofferdams.

When the sled is ready for the sweep, a tug pulls a ⅝-in. cable to the opposite shore where it is secured to a 1½-in. steel winch cable. The winch cable is returned to the far side and attached to the sled. Five small pull cables are secured to the sled's rear blade if they are to be placed as close as possible to the trench surface. They are secured to the front blade and dragged under the sled if a deep lay is wanted.

When the winch has pulled the sled with its five trailing cables across the river, several sections of sheet piling are burned and raised to permit a diver to pass the pull cables through the cofferdam. The cables then are secured temporarily to a dead man at the foot of the winch.

Then, one of the pull cables is hooked to winch cable. A tractor on the opposite bank drags the winch cable across the river where the latter is attached to one of the 14-in. electrical conduits. The winch then pulls the conduit across. This procedure is repeated for each of the five cables. The winch cable follows the path made by the pull cable. In the same way, the conduit follows the identical path, thereby insuring near perfect spacing.

Once the conduits are laid and secured to the opposite bank, the cofferdams are filled with sand and cut down to the high water mark.

Supervising construction for ConEd was Edward Schramm, assisted by William Vezzell and Joseph Corcoran.

WORKMEN GUIDE CABLES through openings in cofferdam. Five sections of steel sheet piling were lifted for cable opening.

TRACTOR PULLS CABLES taut on launching side after crossing. Deadman is welded to back to maintain proper cable spacing.

Caterpillar D9 Tractor push loading a DW20 Tractor and No. 456 scraper unit near San Antonio, Texas. Both D8 and D9 Tractors have Cat Torque Converter Drive available as optional equipment— standardizing on Twin Disc Torque Converter components.

# 6 profitable reasons for having a *torque converter* in your crawler tractors

*For high work output . . .* and *long equipment life,* more and more contractors are ordering their new Caterpillar D8 and D9 Crawler Tractors complete with Cat Torque Converter Drive.

Torque converter drive offers *six profitable,* proved features applicable to your crawler tractors. 1. Three-stage design provides the highest engine output torque multiplication available. 2. Engines deliver *constant* high-horsepower output. 3. Power is *automatically* matched to load demands, with gear-shifting minimized or eliminated—operator efficiency is boosted. 4. Heavy load pick-up is smooth, even, without clutch slippage —resulting in less track slippage. 5. Overloads, shock loads and vibrations are cushioned, through *fluid* connection . . . providing *long* tractor life with a minimum of maintenance. 6. Infinite variety of ratios are available to work with, permitting smooth, accurate control of loads and delicate "inching" under power.

Wherever earth and rock are moved, tractor owners are using these six basic advantages *to convert their horsepower into more profits.* That's why Caterpillar designed a torque converter drive for optional use in the D8 and D9. They worked closely with Twin Disc Engineers, and for the torque converter driven models *standardized* on Twin Disc Torque Converter components.

See your Caterpillar dealer today for complete information on a torque converter-equipped Cat D8 or D9 Tractor.

TWIN DISC

**TWIN DISC**

*Torque Converters*

**TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois**

# ACID TEST!

## "These CAT* Engines take it in stride"

"If you want to give an engine the acid test," says Frank Muren, superintendent of this road job in the Mojave Desert, "put it in a hot plant like ours. There's heat and plenty of dust, but these Cat Engines take it in stride."

There are three Caterpillar D17000 Engines in this hot plant at Edwards Air Force Base, Calif., with more than 14,000 hours among them—and *no repairs*. One of them is shown here powering the dryer, together with a Cat D318 supplying auxiliary power. The contractors, Fredericksen and Kasler of Sacramento, Calif., have seven Caterpillar Engines on the job with a total of about 25,000 hours.

Cat Diesels owe their trouble-free work lives to such features as "Hi-Electro" hardened crankshaft journals, long-lasting aluminum alloy bearings, and highly *effective* filters and seals that keep lubricants *in* and harmful grit *out*.

It's *economical* work life, too. Every Cat Diesel is built to operate cleanly and efficiently even on low-cost fuels, such as No. 2 furnace oil. The rugged simplicity of these efficient power units means easy maintenance, minimum down time, low repair bills.

There's a Caterpillar Engine or Electric Set for *your* job requirements, to 520 HP and 315 KW. Your Caterpillar Dealer will gladly help you select the equipment that will do more work for you at lower cost. See him soon—you can count on him whenever you need fast, reliable service or original Cat parts.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

**CATERPILLAR***

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MODERN HEAVY-DUTY POWER

READ WHY SO MANY CONTRACTORS SPECIFY BOSTON HOSE AND BELTING

# How to avoid next month's downtime ...now!

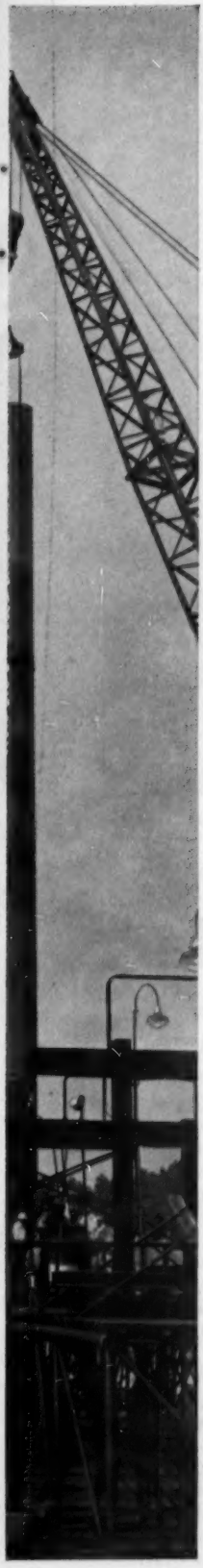
**BREAKDOWNS ON ANY CONSTRUCTION JOB ARE COSTLY AND TIME CONSUMING.** Contractors simply can't afford to take chances. That's why so many specify Boston hose and belting. They know Boston products have been used—*and proved reliable*—on the biggest, toughest construction jobs . . . jobs like the Lake Pontchartrain Causeway project.

**BOSTON SPECIALIZES IN INDUSTRIAL RUBBER PRODUCTS.** It's not just a sideline. Boston Woven Hose & Rubber Co. has one aim: to keep right on developing industrial rubber products that will outperform all others on the job.

**YOUR BOSTON DISTRIBUTOR GIVES YOU FAST SERVICE** —immediate delivery when you need it, because he anticipates your needs, prepares to meet them. He's the Boston Man in your area, an expert in industrial rubber products with a thorough knowledge of construction. Why not call him today?

**HERE'S PROOF OF BOSTON PERFORMANCE:** On the $46 million Lake Pontchartrain Causeway project, Boston Jetting Hose and Pile Driver Steam Hose proved rugged and dependable by driving more than 4600 mammoth piles (each 96 feet long and 67,200 pounds) to help build the 24-mile span.

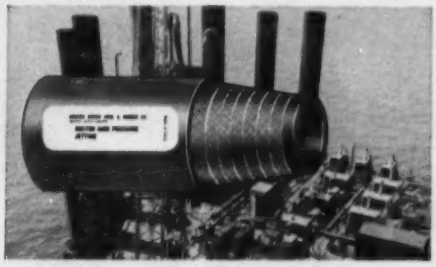
INDUSTRIAL HOSE • FIRE HOSE • BELTING



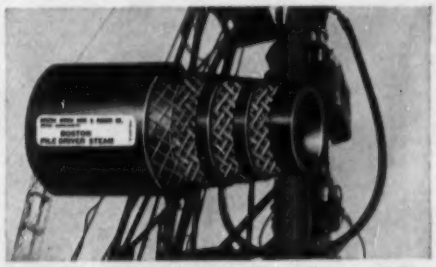
## BOSTON CHECKLIST FOR YOUR HOSE AND BELTING REQUIREMENTS

**BOSTON MUCKER BELT:** Reduce your maintenance costs as much as 34% with Boston Mucker Belt. It simply does not stretch—even after thousands of yards of solid rock. Contractors using Boston Mucker Belt often report replacing worn-out metal hinges seven and eight times *in the same holes!*

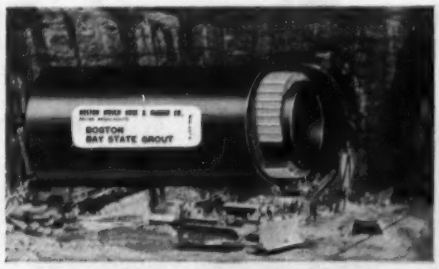
**BOSTON AIR HOSE:** For pneumatic tools, Boston has a specific hose for every use—from chippers to pile drivers. On heavy duty jobs most contractors use Boston's wrapped fabric hose (shown) or Boston's wire reinforced hose. Both offer long service life, unusual flexibility.



**BOSTON WATER HOSE:** As much as 72% more durable than other hose on tunnel, dam and bridge construction, Boston water, suction and jetting hose (shown) are tailor-made for every kind of construction job. That's why Boston water hose is dependable even when the going gets rough.



**BOSTON STEAM HOSE:** Your Boston Man has a complete line of pile driver hose, from 1½" to 2½". Every hose is specially designed to resist rough hammer action and deterioration caused by steam and oil. Boston also offers a wide selection of rugged hose for general steam service.




**BOSTON CONCRETE HOSE:** Boston's hose for handling cement, concrete and grout is engineered for long use under the toughest conditions. Boston Concrete Placing Hose and Bay State Grout Hose (shown) proved their worth on key projects like Queens Midtown Tunnel and the Delaware Aqueduct.

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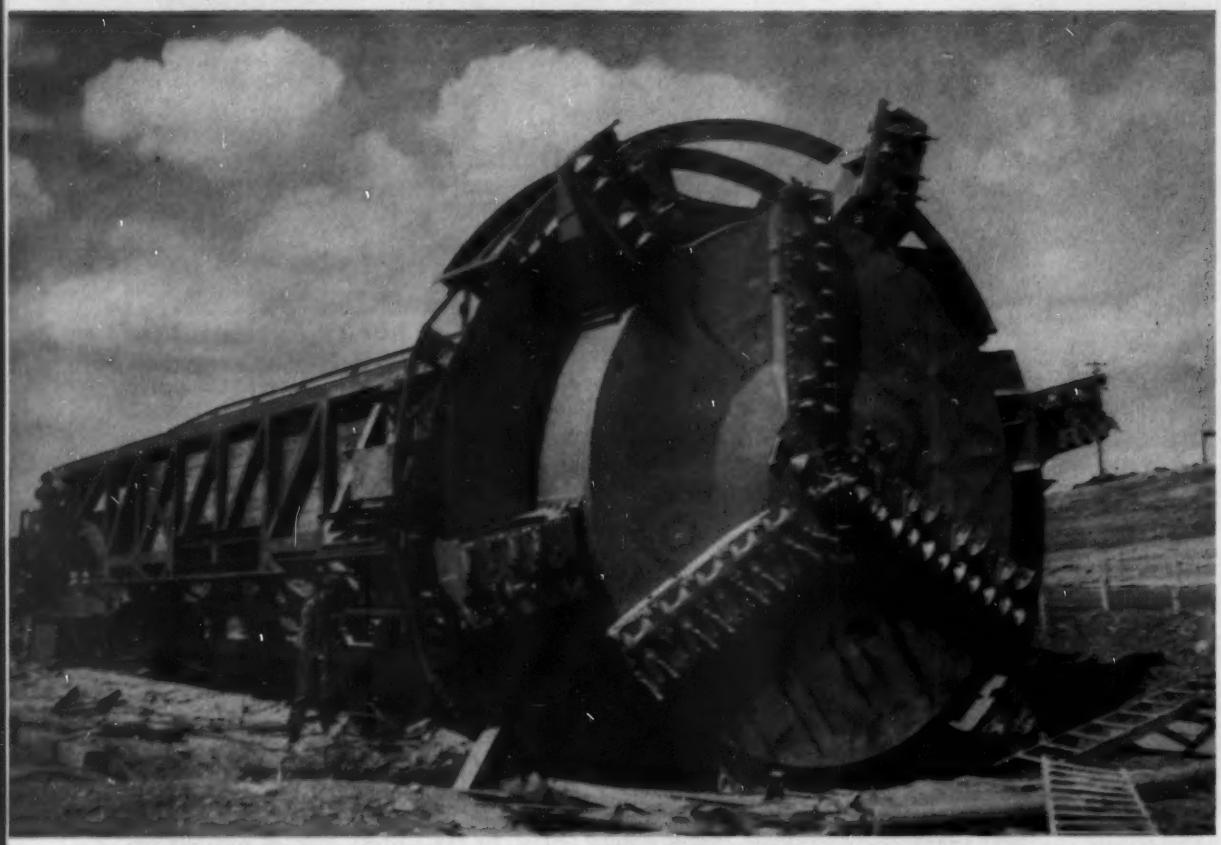

MINING MACHINE is readied to bore six tunnels, about 26 ft in diameter and averaging 1,600 ft each in length, at Oahe Dam on the Missouri River. Rig is 90 ft long, weighs 129 tons, and two 200-hp electric motors drive its counter-rotating cutterheads.

# Tunnel Rig Chews Through Shale

INTAKE STRUCTURES rise from bare South Dakota prairie above Pierre. Compacted fill being placed behind them will give mining machine good face to start tunneling through.

By J. L. Feller, Office Engineer,
Oahe Constructors

DIVERSION TUNNELS of the Corps of Engineers' Oahe Dam, near Pierre, S. D., are proving grounds for one of the most revolutionary methods of tunneling in construction history. In the soft shale there, ordinary tunneling methods are left behind and a radically new machine has taken over.

The mining machine, or Mole as it is affectionately called, is an all-purpose jumbo. It has two concentric rotary cutterheads that do the actual mining, taking the place of conventional drills and explosives. The outer cutterhead also incorporates six buckets which pick up and elevate the muck. Coupled with a belt conveyor system running to the portal, they replace a separate mucking machine. Also, ring beams for ground support are assembled and placed by

# HOW THE CAT* No. 12 MOTOR GRADER HELPED CUT COSTS

## *on the Garden State Parkway*

Last year New Jersey's fine four-lane Garden State Parkway went in from Cape May to Paramus. Along one section of this big job the haul roads ran a mile and a half from borrow pit to fill—and the fill was 100% sand. It took continuous grading to keep the fill compacted, and Public Constructors, Inc., of Pleasantville, N. J., relied on four Cat No. 12 Motor Graders to do the job, as well as to keep the haul roads in shape.

"What would a contractor do without Caterpillar when there's an earthmoving job to be done?" wonders Supt. John W. Franks. Mr. Franks likes lots of things about the No. 12—mostly its low-cost features. And the *new improved* No. 12 offers greater low-cost advantages than ever.

**Costs less to maintain.** There's extra life built into every part of the Cat No. 12. The new exclusive Caterpillar Oil Clutch, for example, practically eliminates disc replacement and reduces down time considerably.

**Costs less to operate.** Just one reason among many: the heavy-duty 115 HP engine delivers efficient power on low-cost non-premium fuels.

**Produces more.** Positive controls; easy, natural steering that maintains "feel of the road"; clear visibility; fast, accurate blade positioning—features like these add up to maximum operator comfort and convenience, higher production on any job.

**AND NOW, ANOTHER NEW COST-SAVING FEATURE: New tubeless tires** do away with expensive tube and flap trouble, eliminate costly tube replacement and can cut over-all tire down time *by 80%!*

No wonder Supt. Franks says, "To us, Caterpillar is the old reliable, always out in front with new designs that assure you not only the latest, but the best."

See *your* Caterpillar Dealer for full details on the high-producing, cost-cutting Cat No. 12 Motor Grader. There's nothing else like it available—anywhere.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

**CATERPILLAR***

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**99% OF ALL CAT MOTOR GRADERS EVER BUILT ARE STILL AT WORK**

# Cost advantage or not, contractors still prefer ARMCO PIPE

Usually, the installed cost of Armco Corrugated Metal Drainage Structures is lower than that of other types. But there may be times and conditions when there is little cost differential. *And still contractors prefer to buy Armco Pipe!*

## Why is this true?

First of all, there is the matter of delivery. No matter where your job is located, there is a nearby Armco manufacturing plant from which you can get quick delivery of Armco products.

Even more important, according to many contractors, Armco doesn't operate on the principle of "sell and forget." The Armco man—a combination of salesman and engineer—usually works closely with the contractor during installation of large or complex jobs. What's more, he is always on call to answer questions, and make suggestions or recommendations (when asked). Contractors find him a handy man to have around.

## Reputation for high quality

For more than 50 years Armco has been a prime producer of corrugated metal drainage structures. These products, based on many years of research and practical field experience, are well-known throughout the construction industry for their high quality.

## Armco subcontracts assure profit

Sometimes, because of lack of manpower, equipment or specialized experience, you may prefer to subcontract the installation of Armco products. The Armco Construction Department will handle the job on a fixed-price basis. Costs are low, the service is not competitive with prime contractors.

Write us for more data on Armco Corrugated Metal Pipe or Armco MULTI-PLATE Drainage Structures. Armco Drainage & Metal Products, Inc., 4136 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

**ARMCO**
CORRUGATED METAL
DRAINAGE STRUCTURES

ARMCO

## TUNNELING RIG . . .

Continued from page 78

a special jig mounted on the machine directly behind the cutterheads.

The Mole has just finished boring six tunnels, averaging 1,600 ft each, through a soft Pierre Shale formation. Finished diameter is 19 ft 9 in. Driven diameter varies from 26 ft 3 in. in the first 120 ft from the portal to 24 ft 9 in. in the rest. Specifications call for tunnel ribs to be installed on 4-ft centers and to be kept within 9 ft of the face at all times.

Average rate of advance, including maintenance time, is about 3.5 ft of tunnel per hr. It has run as high as 56 ft in 7 hr and 129 ft in 24 hr, working around the clock.

The machine that makes this phenomenal progress is approximately 90 ft long and weighs 129 tons. At its business end, its rotary cutterheads carry fixed teeth and disk-type cutters that break out material from the tunnel face.

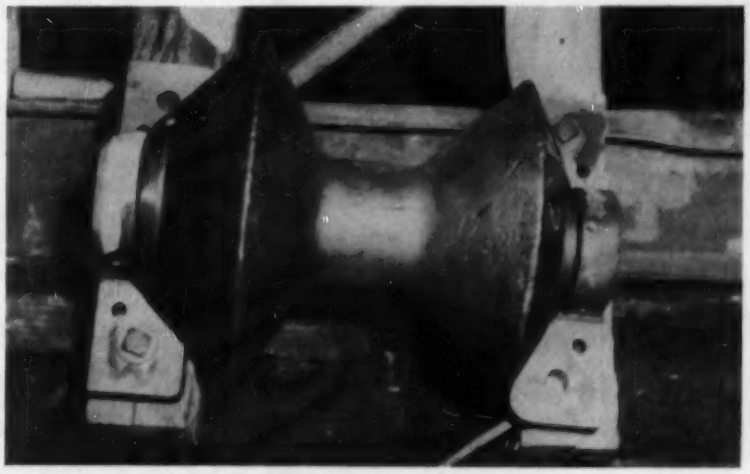
### Teeth Cut Shale

Actual cutting is done by the fixed teeth. They are placed in three radial rows spaced 120 deg apart on the inner cutterhead; the outer head mounts six sets of teeth spaced at 60-deg intervals. These fixed teeth cut grooves, or kerfs, amounting to a series of concentric circles in the tunnel face. The kerfs so formed are 8 to 10 in. apart radially and 6 to 8 in. deep. The fixed cutters are a modification of the H&L No. 21 tooth. They are hardfaced with Tube Borium on the side away from the face to give a self-sharpening effect. Teeth have to be replaced about every 40 ft of tunnel and take 30 min to change.

Following the fixed cutters in their rotation with the cutterhead are beveled rollers, known as disk cutters. They simply roll around with the lead edge following the center of the core left between two adjacent kerfs. Pressure of the disk on the rock creates a wedging action that shatters the core to a depth well below the surface. The shale breaks out and falls to the tunnel for mucking. The life of the disks is remarkable because the unit is simply a mild steel casting. In driving six tunnels only six disks were replaced and these because of failure of the seals in the bearings rather than through excessive wear of the disk edge.

*(Continued on page 84)*

TOOTHED CUTTERS alternate with disk cutters to break out shale as head rotates. On outer cutterhead they are mounted on buckets that lift muck, dump it to belt conveyor.



DISK CUTTER is only a mild steel casting. At tunnel face, beveled roller breaks out core between two grooves cut in shale by adjacent toothed cutters that precede it.

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# a 900 cfm GYRO-FLO

## HAS BEEN ADDED TO INGERSOLL-RAND'S COMPLETE LINE OF PORTABLE ROTARY COMPRESSORS

**Now there are 5 sizes . . . 125, 210, 315, 600 and 900 cfm.**

*There's only one GYRO-FLO... Ingersoll-Rand's Rotary Portable Compressor... Introduced in 1950*

IN THIS new addition to the time-tested GYRO-FLO line, Ingersoll-Rand brings you a heavy-duty compressor that delivers a full 900 cfm at 100 psi — yet weighs only 14,340 pounds ready-to-go, and is but slightly larger than the famous GYRO-FLO 600.

The smooth, dependable and virtually maintenance-free performance of the GYRO-FLO rotary compressor is a matter of record on drilling and construction projects the world over. When you have a job calling for 900 cfm of air power, ask your Ingersoll-Rand representative to tell you more about this new, heavy-duty GYRO-FLO 900.

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  —a patented feature. Correct combination of blade contour and angles assures smooth oil flow, for most efficient torque multiplication. No cavitation to cause turbulence or air pockets which impair efficiency and cause destructive wear.
- **Self-Contained Oil Circuit**
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  —no welds or fabrications to distort under extreme loads.

Every user of horsepower will find this bulletin well worth reading. The coupon brings your copy promptly—no obligation.

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**Jackson 6, Michigan**

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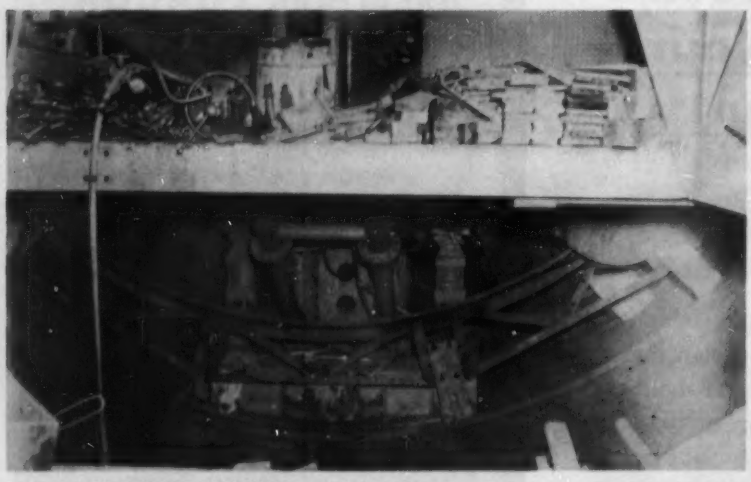
TUNNELING RIG . . . Continued from page 81

TOP OF MINING MACHINE is fitted with rails on which ring-beam quadrants are slid forward to jig for assembly into tunnel ribs, which must be kept within 9 ft of face. Note operator's panel up ahead, from which he controls machine's boring operations.



BOTTOM OF MINING MACHINE carries hydraulically adjusted shoe sliding on invert to support front of rig. In foreground, ring-beam jig moves another section into place.

The rotating ring for the outer cutters is the same diameter as the inner cutterhead. And the outer six sets of cutters are mounted on buckets projecting radially from the machine. Thus the annular space between them leaves a place where the muck can fall to the invert. A shield back of the outer cutterhead confines the rock and dust close to the face of the tunnel, where it can be picked up by the buckets on the outer cutterhead acting like a rotary elevating conveyor. Muck is picked up, raised, and dropped from the buckets onto a conveyor belt built into the machine.

The cutterheads are powered by two 200-hp wound-rotor motors through gear mechanisms. Two 750-kw GM diesel generator sets supply 2,300 v for the operation, and this is stepped down by three 167-kva transformers mounted on the machine. Motor controllers provide short-circuit protection and permit centralized push-button control at the operator's station. Protection of the electrical system is provided by a dead front panel with circuit breakers and ground relay. Average power consumption is only about 45% of capacity.

As you view the Mole head on, its inner head revolves counterclockwise and its outer head clockwise so as to balance the tremendous torque. The inner head is 18 ft 6 in. in dia and each of the outer cutter assemblies adds a radial increment of 3 ft 9 in. Thus the effective cutting diameter of the entire machine is 26 ft. It is adjustable, however, to fit different tunnel sections within a small range. This is done by adding or removing a 9-in. extension on each bucket on the outer cutterhead. This last was necessitated because plans required the first 120 ft of each tunnel to be 18 in. larger than the remaining sections.

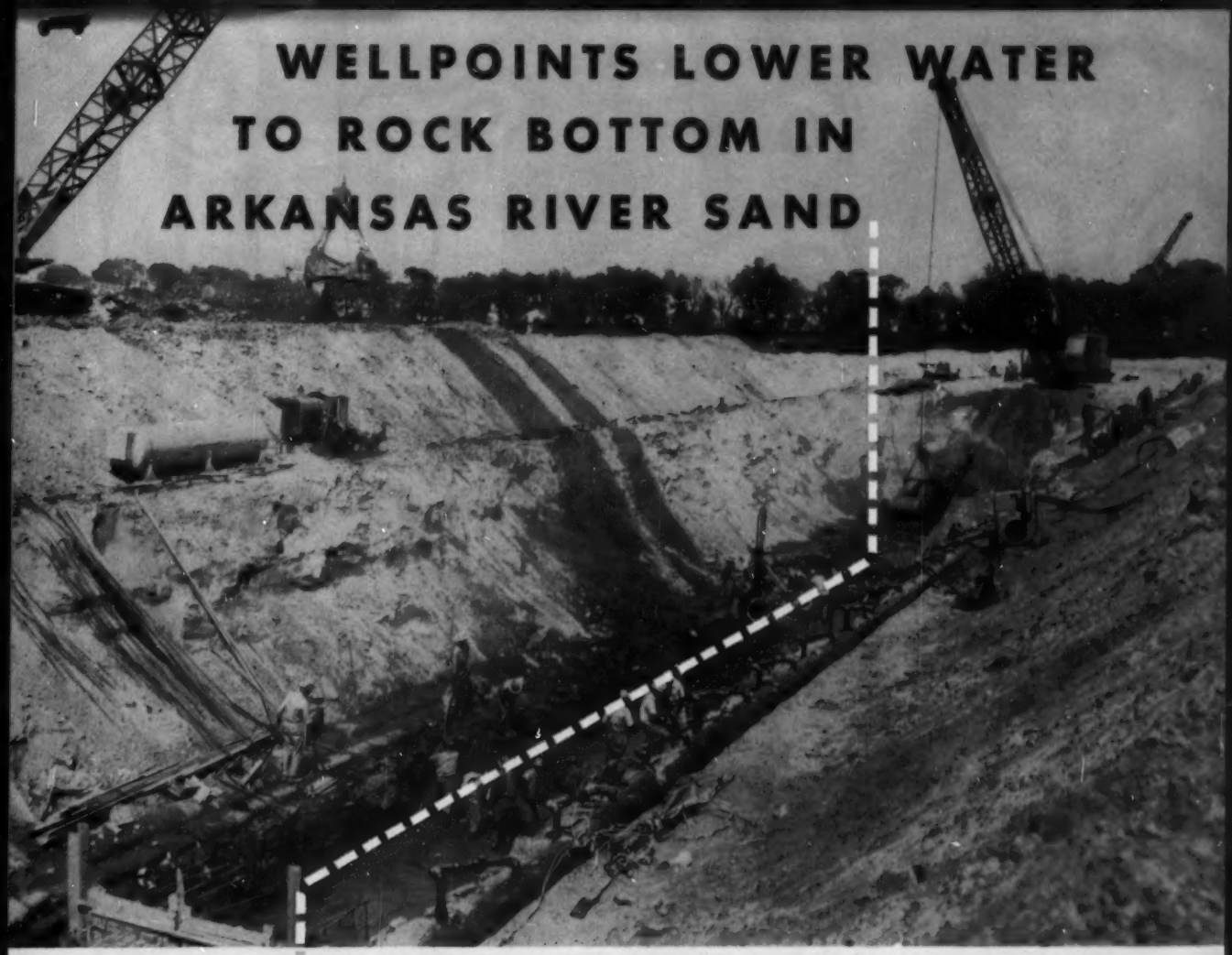
## Sliding Roof Support

Directly behind the cutterheads the Mole is fitted with a circular segment of structural steel that serves as a sliding roof support as the machine moves forward. Tunnel ribs for permanent ground support are installed by a ring-beam jig directly behind this sliding canopy. The jig itself is a continuous ring upon which quadrants of rolled H-beams are placed and bolted together to make the final assembly.

Beneath the sliding canopy sits an operator who controls the ma-

*(Continued on page 89)*

# WELLPOINTS LOWER WATER TO ROCK BOTTOM IN ARKANSAS RIVER SAND



**PROJECT:** Construction of two concrete conduits, 36" wide, 1900' long, under the Arkansas River, to serve Tulsa, Oklahoma's new sewage disposal plant.

**The BIG PROBLEM** on this deep excavation was WATER—14' of it in sand and gravel overlying shale rock.

**It was SIMPLY SOLVED** by installing a Moretrench Wellpoint System which pulled the water down to shale with these immediate results:

Excavation was handled quickly—in the dry.

Rapid job progress, essential during low river stage, was assured.

Sheeting was completely eliminated. Banks sloped.

Time and money were saved.

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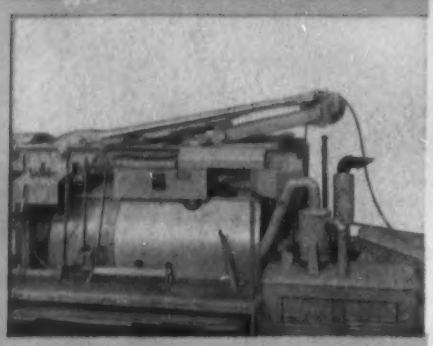
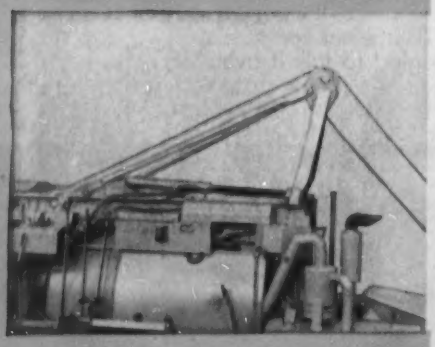




### A-Frame Down

With the A-Frame in the down position, as shown at upper left, the MultiFoote Paver overall height is instantly reduced to clear bridge or overpass. This low clearance not only facilitates traveling under low overhead structures but also aids in transporting.

### A-Frame Up

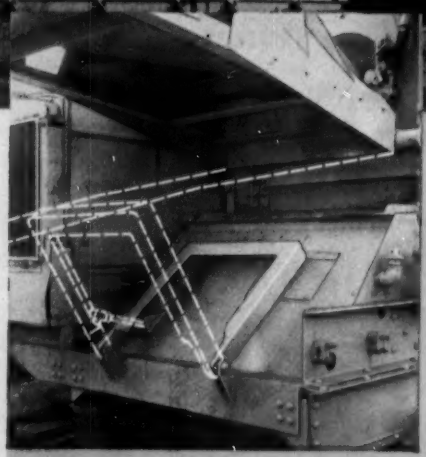
By touching a hydraulic control lever the A-Frame is quickly raised and the MultiFoote is ready for operation, as shown in lower left. With this arrangement the MultiFoote Paver has retained all the advantages of single cable operation.

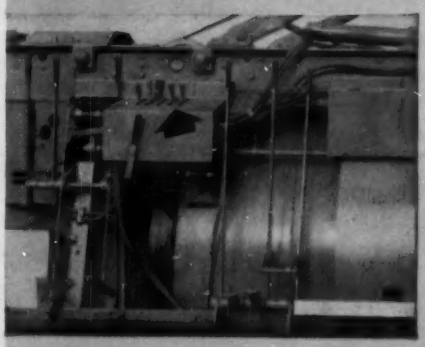
### Skip Carrier

When traveling with the A-Frame folded down, the skip rests on a hydraulically controlled skip carrier, as shown by the dotted lines in the photo at upper right. When the paver is working, the bracket folds down against the frame, out of the way.

### Operator's Platform and Controls

Five small finger operated levers in the picture at lower right control hydraulic cylinders which actuate A-Frame, skip carrier bracket, transfer, discharge and bucket spotting. All controls are centrally located for ease and speed of operation.





# NEW LOW CLEARANCE HEIGHT and COMPLETE HYDRAULIC CONTROLS make the MULTIFOOTE even better

## New Design Cuts Cycle Time by giving you Faster Skip Operation PLUS—faster travel preparation • faster bucket spotting • faster discharge

MultiFoote Pavers with these new hydraulic controls and faster skip operation give you an even faster cycle time than before, *plus a new low overall clearance height.* You get all the advantages of single-cable skip control with its high speed, simple reeving and low maintenance cost. Now in a matter of a few seconds, the operator can raise the skip carrier bracket and lower the A-frame with fast-acting hydraulic cylinders to get under overpasses, bridges or other low overhead clearances.

Hydraulic controls also step up the high capacity of the MultiFoote by faster batch transfer, faster discharge chute operation and faster bucket spotting. These hydraulic controls plus the faster skip operation now mean that you can put out more concrete with a Blaw-Knox Paver than any other paver.

All the features that have made MultiFoote Pavers the leaders in their field have been retained or improved. The efficient double-cone drum folds material over and over for thorough mixing, has no corners for material to build up in and cleans itself with a scouring action. High operator's platform gives the operator an unobstructed view of skip and bucket at all times—there are no "dead spots." Efficiently grouped controls for manual and automatic cycle operation cut seconds out of the mixing time for each batch. Shovel-type crawlers with their self-cleaning action give positive traction, ample flotation on soft grades and are designed to stand up to miles of highway paving travel. Volume measurement, non-pressure water system that is unaffected by grade, the wide, smooth rigidly mounted skip and simplicity of design assure shift-after-shift high capacity and easy upkeep.

If you are bidding on turnpike work or any big paving job, see your Blaw-Knox Distributor and get all the details on the New MultiFoote with hydraulic controls.

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**BLAW-KNOX COMPANY**

**Construction Equipment Division, Mattoon, Illinois**

**POWER HYDRAULIC CONTROLS** and hydraulic-actuated clutches keep even the roughest jobs rolling smoothly. Hydraulic system eliminates need for more than 100 mechanical parts. Self-compensating clutches need no close or frequent adjustments.

**TOUGH, IMPACT-RESISTANT STRUCTURE** with all-welded, stress-relieved lower and upper frame helps rig absorb digging shock . . . handle the worst rock jobs with little need for maintenance and repair.

**MORE POWER** — Anti-friction bearings, splined shafts, precision machinery alignment help convert more of rated horsepower into usable power. Rugged construction permits use of extra power.

**SPECIAL EXCALODER ATTACHMENT** for underground loading or general bulk materials handling. The Excaloder features straight line bucket action and unusually low overhead clearance.

# How to step up ROCK OUTPUT

## Be ahead on every job with all these Link-Belt Speeder features

WHATEVER size rock rig you need, there's an advanced-design Link-Belt Speeder that can handle rugged work faster, easier, at less cost per ton or yard. Every Link-Belt Speeder rock shovel offers you Speed-o-Matic—the *true* power hydraulic control system. It's designed to make the operator's job so easy, so non-fatiguing that he'll utilize the machine to its full productive capacity—all shift long. And what a capacity! On-the-job figures show that Speed-o-Matic—even when the machine is wading through shot rock—accounts for output increases of up to 25% or more per shift!

Precision built throughout, a Link-Belt Speeder has an all-welded, stress-relieved upper and lower frame. Its power train features anti-friction bearings, splined shafts and cut spur gears. Quality construction like this pays off in lasting top performance, lower costs for maintenance and service.

For details, see your distributor or write LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA.

### Faster, stronger — from boom tip to treads

- Rugged, all-welded upper and lower frames, plus all-welded boom and dipper sticks for maximum strength-to-weight ratio
- All-manganese bucket*
- Powerful Independent Chain Crowd for positive crowd and retract, minimized maintenance
- Hydraulic dipper trip
- Torque converter units for greater shock absorption, multiplied torque when digging gets rough*
- Self-cleaning tracks and drive sprockets
- Powerful, two-directional automatic traction brakes which serve as digging locks
- Large diameter ring gear and conical rollers for faster, smoother swings
- Two-speed travel in either direction**
- Independent Swing and Travel that saves one hour a day in shifting time**
- Sealed track rollers keep grease in, dirt out**

**Optional, extra*

***For most models*

**LINK-BELT SPEEDER**

*Builders of a complete line of crawler and rubber-tired shovel-cranes*

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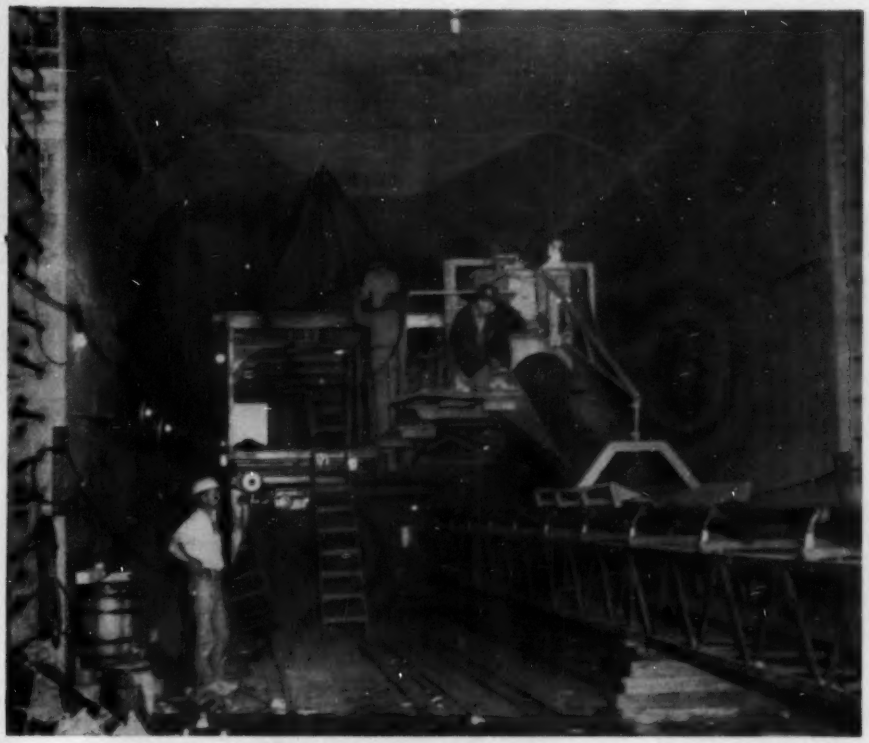
TUNNELING RIG . . . Continued from page 84



MUCK IS CARRIED from tunnel face by belt conveyor on mining machine, which dumps to second belt. This enlarged section is "tunnel entry" just inside of the intake portal.

MUCK IS DUMPED into scraper by portable conveyor that receives material from belt running in tunnel. Mining machine discharges muck at average rate of 400 tons per hr.

chine from a control panel. He can advance the machine and swing it in any direction. When digging, the machine is supported on a shoe under the front. This shoe slides along the excavated invert and has an adjustment to change the boring diameter. Two hydraulic jacks on the shoe move the cutterhead up and down for vertical control. The machine may be retracted from the face by a horizontal jack also mounted on the shoe. Horizontal control is attained by jacks mounted on each side at springline just behind the cutterhead. A small pilot bit and cone that projects 16 in. ahead dead center from the face of the cutterhead helps hold the machine on line and grade.

Forward motion is provided by two hydraulic rams, one on each side of the machine about 9 ft back from the face. These are driven by a 25-hp motor. Each has a 4-ft stroke and bears on the tunnel ribs, or ring beams, at springline. As the machine moves forward, they are retracted and reset with about 4 min of lost time.

The rear of the Mole is supported by two double-flanged wheels on each side about 22 ft back from the face. These wheels ride on independent, 13-ft-gage rails. They consist of 121-lb rail mounted on a 12-in. WF 49-lb beam. These beams, in turn, are set on 12-in. WF 49-lb brackets atop the ring beams. The bottom side of each bracket is curved to fit the ring beam, and a 1x1x2-in. lug is welded to the ring beam to prevent the bracket from sliding.

Three 12-ft rail sections are needed on each side. As the Mole advances, these are picked up and leap-frogged ahead by a small traveling chain hoist suspended beneath the machine.

### Muck Handling

Muck is removed from the tunnel by a 24-in. Barber-Greene belt conveyor that is built up in 60-ft increments as the heading lengthens. An inclined portable 24-in. B-G conveyor at the end of the tunnel conveyor system loads two 12-yd Euclid scrapers for hauling to a waste pile. Because of the Mole's high output, it is sometimes necessary to supplement the hauling units with a 15-ton Euclid end dump.

The tunnel conveyor is supported by ties that also carry a tunnel railroad for hauling supplies. The track is constructed on the ring beams—first by laying a 6x8-in. cottonwood tie 10 ft long on each beam, then the 60-lb rail on a 36-in. gage. Because the ring beams are on 4-ft centers, cribbing is set between the beams to distribute the load on 2 ft centers. Decking is placed over the entire width, and the muck conveyor is situated off to one side so as not to interfere with the tunnel railroad.

### Tunnel Haulage

An 8-ton Goodman storage-battery locomotive carries mine ties, wire mesh, ring beams, and hardwood blocking to within 100 ft of the mining machine. A 2-ton Whiting special monorail removes the supplies from the railroad cars and places them atop the Mole.

Because the shale deteriorates quickly upon being exposed to air, 95% humidity has to be maintained at all times. The resulting fog and wetness add nothing to the ease of operation. To keep the moisture at a maximum, jet sprays are placed approximately every 100 ft in the tunnel.

Ventilation is supplied by an

MACHINE IS WITHDRAWN from one tunnel to start next, and outer cutterhead has been removed to clear ribs and reinforcing. Exposed shale must be concreted within 60 days, so fast mining and lining are imperative. Tunnel humidity must be kept at 95%.

American 100-hp blower through a 30-in. Bemis Bag collapsible duct supported from the ring beams. About 7,500 cfm of fresh air are kept at the heading at all times.

Compressed air needed to run all air tools, sump pumps, and lifting devices is supplied by three Joy 125-cfm and one Gardner-Denver 500-cfm portable compressors. The air and water lines are tied to the ring beams just below springline.

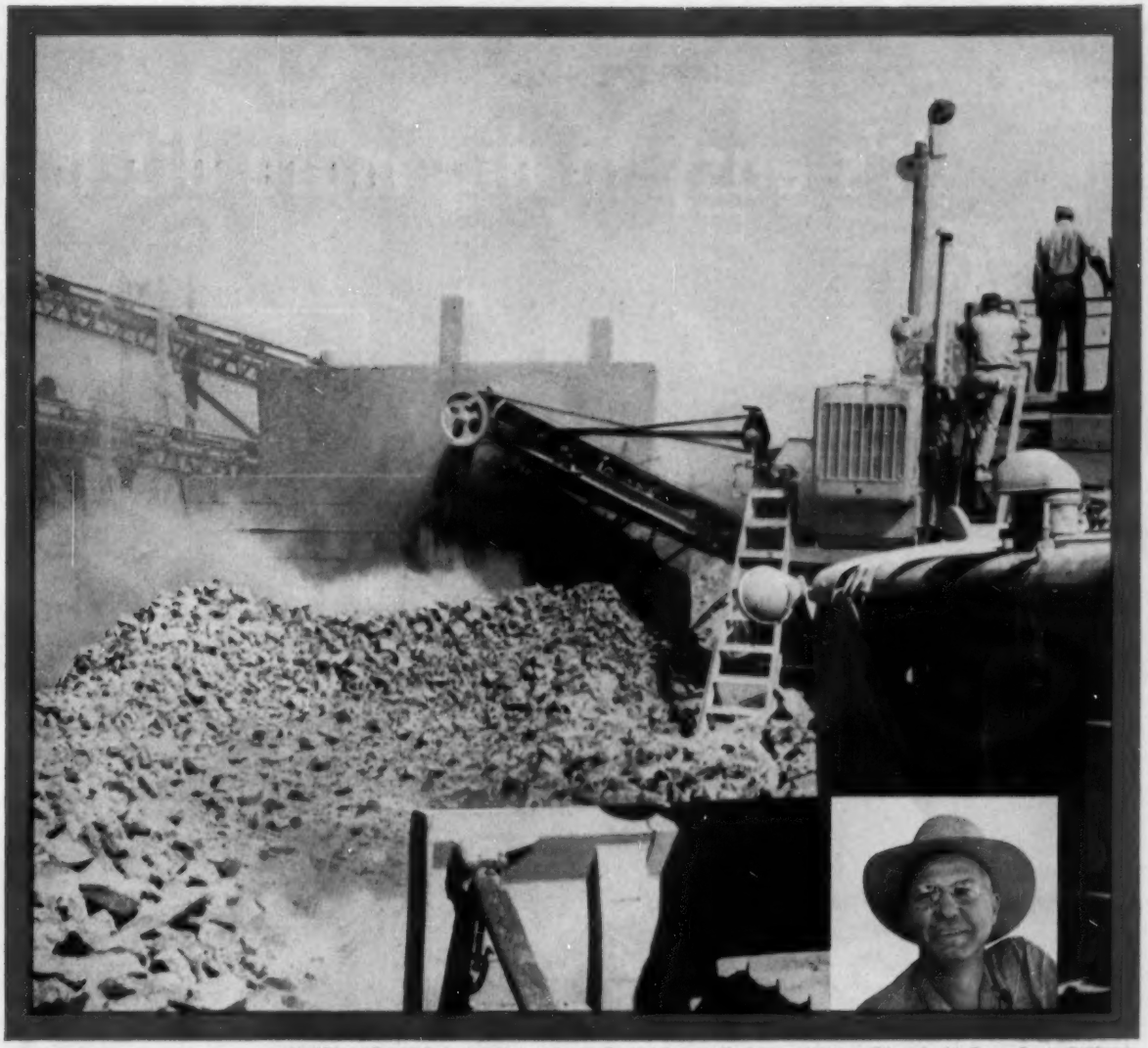
## Concreting

The greatest limitation imposed by contract is that the shale must be covered with concrete within 60 days from time of exposure. Because of this, speed is essential on this project.

Placing of invert concrete starts at the heading and works toward the portal. Arch concreting starts

*(Continued on page 94)*

FORM IS READIED to be moved into tunnel to make arch pour. The jumbo that carries it is fitted with hydraulic jacks for raising it, and steamboat ratchets for stripping.



W. "Slim" Ransdell, equipment engineer, Fredericksen & Kasler, contractors, Edwards Air Force Base, California

# "Under severe desert conditions Guardol holds up..."

"We work our equipment hard 10 hours a day here at Edwards Air Force Base where our earthmoving equipment moved 2,400,000 yards in a recent six months' period, building taxiways and aprons capable of handling some of the world's heaviest and fastest aircraft.

"And because we demand a lot from our equipment... working it every day in the heavy dust and highly-elevated temperatures of the Mojave Desert...we service it with *the finest* lubricants we can buy. In our book, those are Union Oil products.

"In the crankcases of our 'Eucs', DW20s and D8s we are using Guardol, Union's Supplement 2 oil, with good results. Under severe desert conditions Guardol Motor Oil holds up where others won't, and has extended the overhaul intervals on our 'Eucs' and other machines."

Guardol Motor Oil, as Mr. Ransdell says, holds up under operating conditions where ordinary heavy duty oils fail. If you're operating under unusually severe conditions such as F&K have at Edwards A.F.B., it will pay you to order Guardol Motor Oil for *your* equipment, too.

**UNION OIL COMPANY** 76
**OF CALIFORNIA**

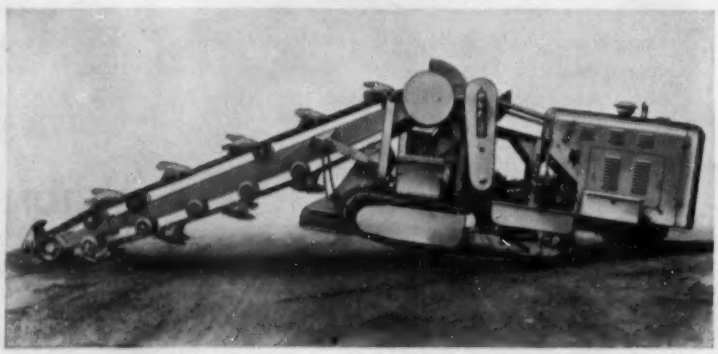
*Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago: 1612 Bankers Bldg. • Philadelphia: Eastwick Ave. & Edgewood St. Dallas: 313 Fidelity Union Life Bldg. • Kansas City, Mo.: 612 W. 47th St. New Orleans: 644 National Bank of Commerce Bldg.*

# It's easy to dig more ditch

*The Gar Wood-Buckeye 407 ditcher digs a full 10 feet deep, from 17 to 24 inches wide.*

**LIVE HYDRAULIC BOOM WITH POSITIVE DOWN-PRESSURE**

The rugged boom on the 407 is raised, lowered and held by an independent, hydraulic control system. Positioning is fast and positive. Double-acting hydraulic cylinders provide full crowd. Illustration shows that down pressure of boom is sufficient to raise machine off ground!



# with a Gar Wood Buckeye 407

**Put yourself in the seat and see the difference...**

**SPEEDS YOU CAN FIND** and use! One selector lever plus high-low range lever makes changing speeds easy. No complicated diagrams to figure out!

**INDEPENDENT LEVER STEERING** is exceptionally easy, positive and reliable. Each crawler has a separate clutch and brake . . . no tendency to wander!

**PUSH BUTTON CONVEYOR SHIFT** speeds work around obstructions. Just push the button to shift conveyor electrically while digging . . . no need to stop machine or leave seat.

**INSTANT BOOM CONTROL**, with live hydraulic action, makes it easy to maintain grade, clear underground obstructions. One convenient lever does it!

## Fast, accurate adjustment for changing conditions saves time, boosts production

The 407 is far easier to operate, control and adjust than any other ditcher in its class. Here's why:

Streamlined and compact, the 407 has the smallest practical dimensions for the widest range of applications. Lowest overall height, 7 feet 3½ inches, for easy transport without disassembly. It's exceptionally maneuverable in close quarters . . . digs neat, clean ditch right up to walls and foundations. Also digs in reverse for tunnelling and undercutting.

Correct balance . . . light weight . . . low center of gravity . . . excellent weight distribution add up to greater stability on any grade. Rugged crawlers provide maximum traction and minimum ground pressure.

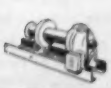
The Gar Wood-Buckeye 407 is the world's largest selling ladder-type ditcher! Find out why. Call your Gar Wood-Buckeye dealer or write: Customer Service Department, Gar Wood Industries, Inc., Wayne, Michigan.

## GAR WOOD INDUSTRIES, INC.

**Wayne, Michigan • Findlay, Ohio**

**Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.**

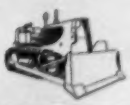
Gar Wood Truck Cranes



Gar Wood Winches

Gar Wood-Buckeye Ditchers

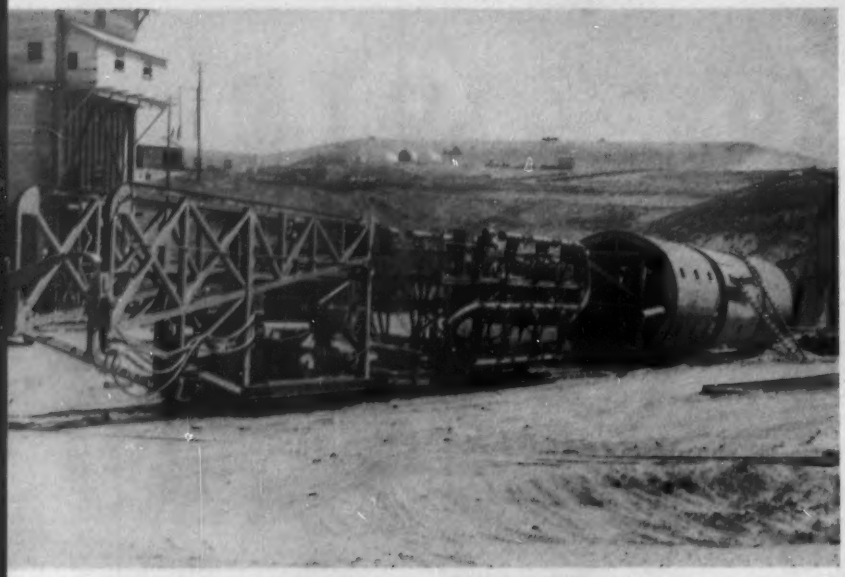
Gar Wood-Buckeye Finegraders



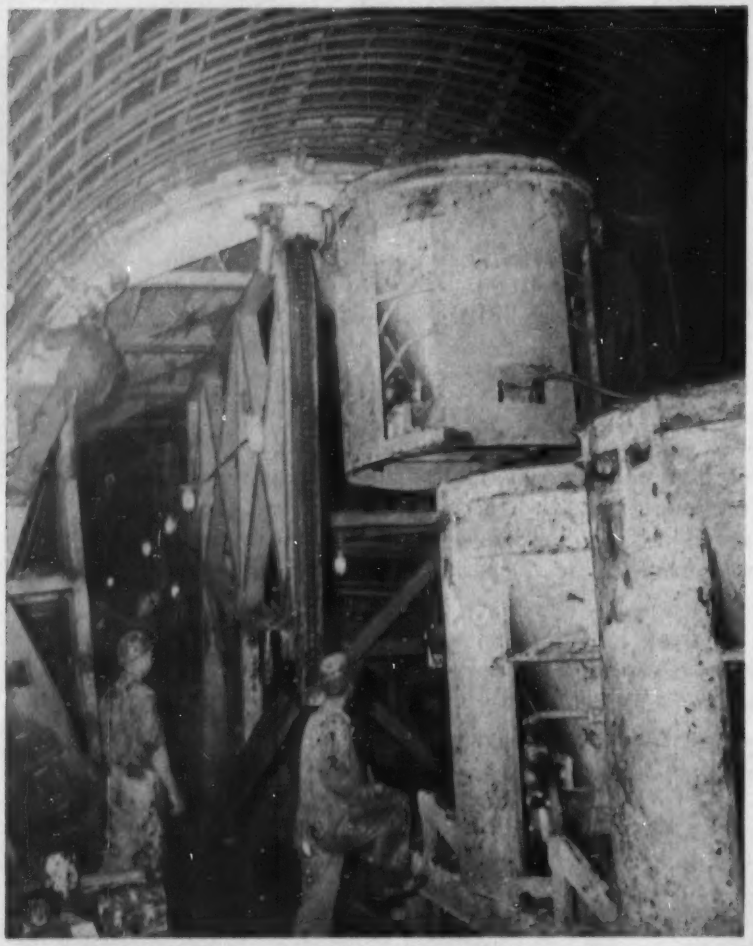
Gar Wood Tractor Equipment

Gar Wood-St. Paul Hoists & Bodies

TUNNELING RIG . . . Continued from page 90



CONCRETING SETUP includes electrically operated cherry-picker and concrete-pump jumbo (left) and pipe jumbo that delivers concrete to forms through matching trap doors.



CONCRETING OPERATION goes smoothly as cherry picker lifts 2-yd bucket of mix from delivery train for emptying into concrete pump. Three 24-ft monoliths are poured daily.

at the portal. Blaw-Knox designed and fabricated the invert and arch forms. The tunnels are divided into 24-ft monoliths, and three monoliths are poured each day.

The concreting setup is unusual. Mixed in a Noble 354 automatic batch plant, concrete is loaded into special Gar-Bro buckets and carried into the tunnel by rail. An electrically operated cherry picker lifts a bucket from the flat car and places it directly over the pugmill of a Rex 200 Double Pumpcrete machine for discharge. The Pumpcrete itself is mounted on the front of the cherry-picker jumbo.

Ahead of this jumbo is a second jumbo fitted with runs of Pumpcrete pipe. Trap doors in the pipe runs correspond with access doors of the arch form so concrete can be pumped in with no trouble.

## Personnel

Oahe Dam, on the Missouri River above Pierre, S. D., is being built for the Omaha District, Corps of Engineers. Col. Thomas J. Hayes is district engineer, and John Sibert, Jr. is area engineer at Oahe.

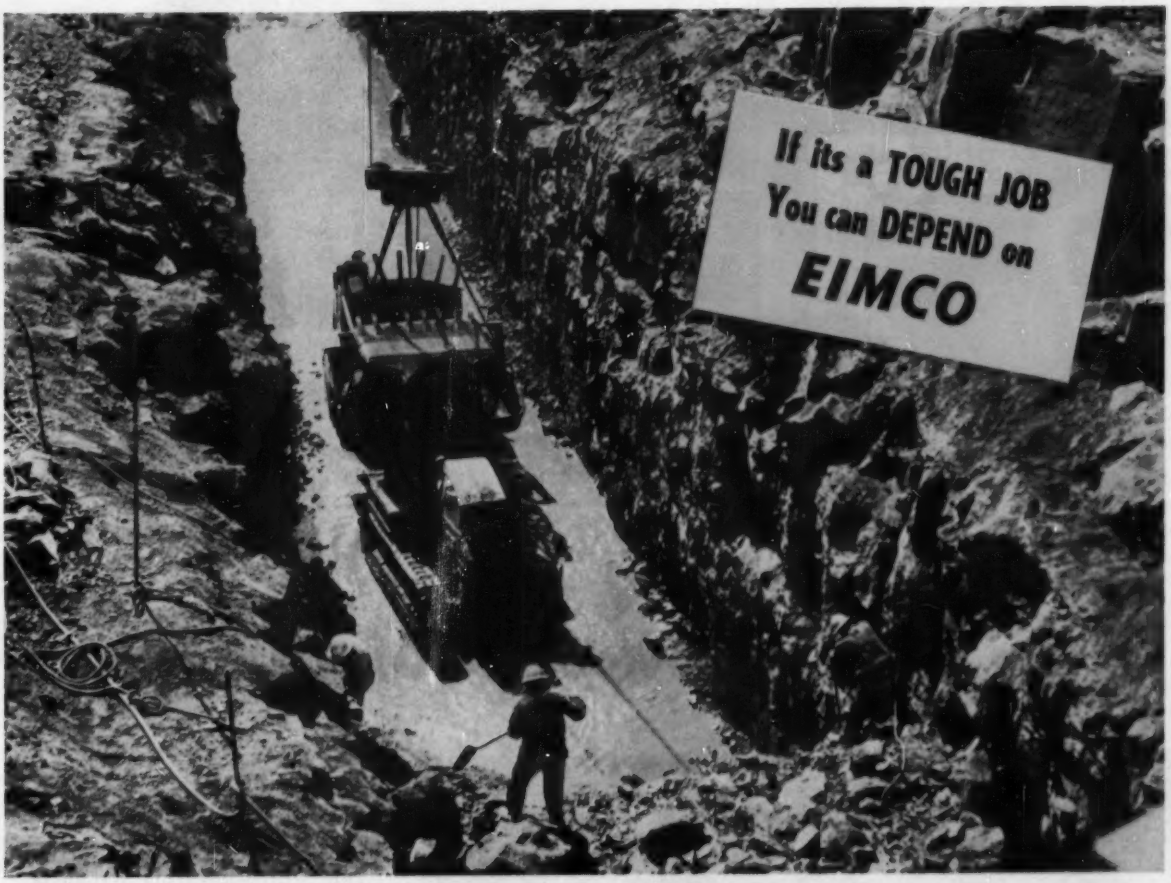
Oahe Constructors, who have the contracts for the work described, is a joint venture comprised of Foley Brothers, Inc., St. Paul; Winston Bros. Company, Minneapolis; C. F. Lytle Co., Sioux City; Donovan Construction Co., St. Paul; and Missouri Valley Constructors, Leavenworth, Kan.

George C. Lindquist is project manager; Robert G. Hoover, assistant project manager; George L. Lyle, general superintendent; and J. G. Tripp, Jr., project engineer.

The Mole was designed by James S. Robbins, St. Paul. It was built in eight months in 10 machine shops under a license agreement with Goodman Manufacturing Co., Chicago, which holds the patent rights. A good portion of the machine was fabricated by the Continental Division of Blaw-Knox Co.

### CONCRETE WORK

Any contractor who does concrete work will find CM&E's series of articles on Concrete Mixing and Placing useful. Reprints are available in booklet form. Single copies are 50¢; for orders of 10 copies or more, the price is 40¢ each. Address your order to the Editor.




# EIMCO KEEPS TOUGH EXCAVATION JOB ON SCHEDULE

Contractor — Montag - Halvorson - Cascade-Austin.

Location — The Dalles, Oregon.

Project — The Dalles Dam — Excavation of South Fishway.

Rock — lava basalt 91,000 cubic yards.

Report — Eimco's 105 Tractor Excavator was purchased for this job after several other types of equipment had been tried and proved either entirely unsatisfactory or incapable of maintaining the desired pace. The fishway (shown above) was excavated in lava basalt (typical of this section) with its characteristic flows and faults. Blasting in the faulted zone left many large blocky pieces of rock.

The method successfully used to excavate the shot rock from the 1500 foot long by 15 foot wide fishway channel which was 16' deep at one end and 60' deep at the other is as follows: A 6 yard rock ship was lowered by a crane and held in place by a Koehring Dumptor. It was loaded by the Eimco and hoisted out. "This method proved to be the most satisfactory and economical. Both machines took a terrific beating to get this job done, but to this day no one has been able to suggest a better way of doing it."

When it comes to bidding on a tough job — here are a few factors to consider: (1) Cubic yards of tough rock loaded per hour given proper haulage equipment — the Eimco will handle on a comparable basis with boom type shovels 1½ to 2 times its bucket size. (2) Cost—compare the prices. (3) Maintenance — compare these costs on jobs similar to your own. (4) Versatility — The Eimco moves quickly, easily. (5) Labor — compare the productivity per man hour.

Yes! You too will find Eimco's best for the tough jobs.

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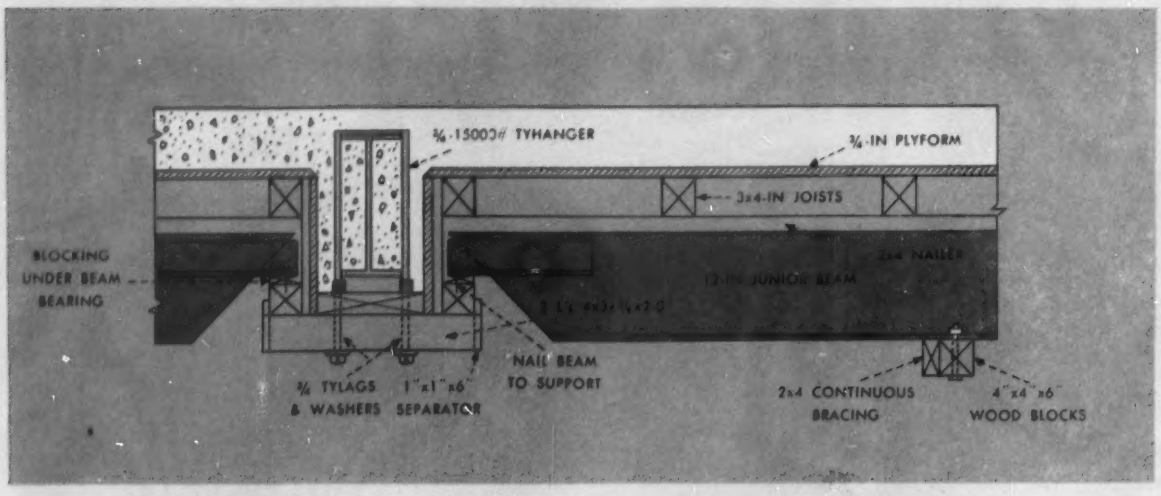
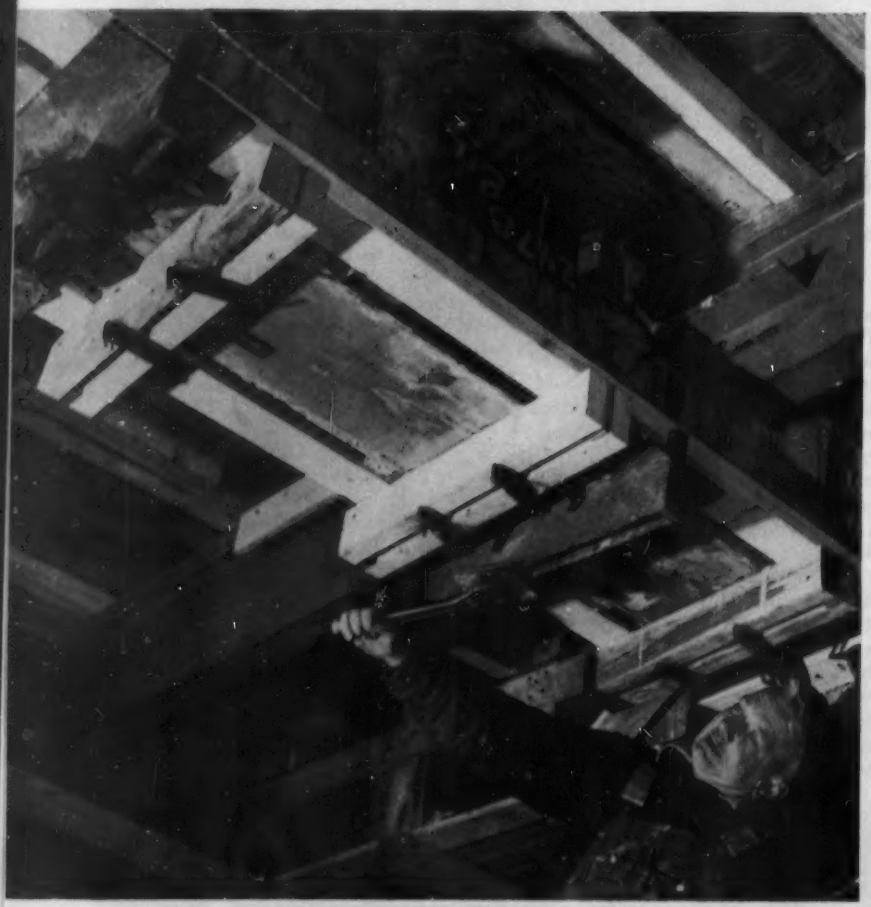



### Here's a Way to Cut Forming Costs . . .

# Lightweight Steel Beams



WORKMAN REMOVES steel support holding lightweight steel beam in position prior to stripping forms under recently poured slab. Simplicity of stringer system speeds erection.

LIGHTWEIGHT STEEL beams serving as temporary stringers eliminate upright shores and cut costs of forming for reinforced concrete floor slabs more than 25%.

This form supporting system is proving successful in construction of the University of Pittsburgh's $15 million Schools of the Health Professions Building. It was developed by J.G. Kassab and Walter R. Wolff of Ragnar Benson, Inc., general contractor on the job.

The building is a steel frame structure with fireproofed columns and beams and about 560,000 sq ft of heavy, reinforced concrete slabs 7 to 8½ in. thick. It will have a 13-story central tower, 10-story wings, and a 5-story auditorium.

Majority of the slab bays are 18x18 ft; some measure 20x20 ft; others are odd sizes. Floors are designed for a live load of between 60 and 75 psf; the average dead load of the slab alone is 90 psf.

### Beam Substitutes for Post-type Shores

Instead of conventional post-type shores, Ragnar Benson uses Jones & Laughlin lightweight steel beams as temporary stringers between the steel framework. The contractor uses approximately 900 of the 12-in. beams—enough for three complete sets of forms. Beams are removed and reused after concrete has been poured and set. Two dif-

WEDGES HAMMERED between beam and joists regulate camber. Lateral movement of beam is prevented by 2x4's nailed to wood blocks.

# Eliminate Shores

ferent lengths are used. The 18-ft lengths serve the majority of spans; and beams, with adjustable (up to 2 ft) ends serve odd-sized bays. This is how they are used:

Workmen first drop ¾-in. 15,-000-lb capacity Tyhangers, spaced 3 ft 8 in. on centers, over the permanent beams. Tyhanger legs extend through continuous 2x12-in. planking which serves as the beam's bottom form. Removable steel angle frames then are hung from the Tyhanger to act as bracing for the temporary beams. The flange at the same time helps support beam bottom forms. The frame is secured to the Tyhanger with ¾-in. Tylags and 4-in.-sq steel washers. Once the frame is secured beam side forms are placed.

### Setting the Beam

A 3x4-in. or 4x4-in. wood ledger then is set over the angle frame, parallel to the permanent beam, to receive the temporary beam. Two workmen lift this into place and bring it up to required grade with tapered wood wedges hammered under the beam bearing.

Camber is computed by established deflection formulas before forming begins. Ragnar Benson compensates for camber by bolting or screwing 2x4-in. wood nailers to the top flanges of the beams. Where thickness of slabs and spans are constant, the camber is built into the wood nailers. Tapered wood wedges are applied on the top of wood nailer to control camber in areas where the slabs vary considerably in thickness and loading.

Slab forming follows. Once beams are in place and camber regulated, 3x4-in. wood joists are placed across the temporary beams approximately 18 in. on centers. Nailing them to the 2x4 nailer provides lateral bracing for the tops of the beams. Lateral stability at beam bottoms is provided by nailing 2x4's to 4x4x6-in. blocks bolted to the temporary beams at their 1/3 points.

Sheets of ¾-in. plywood are placed over the 3x4 joists to receive slab concrete.

Plans call for additional beam form support between the beam stringers. These are simply 4,000-lb snap-tie hangers set between the 15,000-lb Tyhangers. Beam bottom forms here are held by two, 2-ft lengths of 2x4's connected to the tie hanger with hairpins.

Stripping is fast and simple. Once concrete has been poured and sufficiently cured, the bolts holding the angle frames in place are removed. This frees the temporary beams as well as remaining falsework.

### System Saves Space

One of the big advantages, in addition to forming cost savings, is the freedom of movement on slabs below those being formed. The freed area also provides additional storage space inside the work area.

The beams—trade name is Junior Beams—are light and easily handled by two men. They also are relatively inexpensive. Those being used by Ragnar Benson cost approximately 65¢ per lin ft, fob mill. Beams weigh just a little over 11 lb per lineal foot.

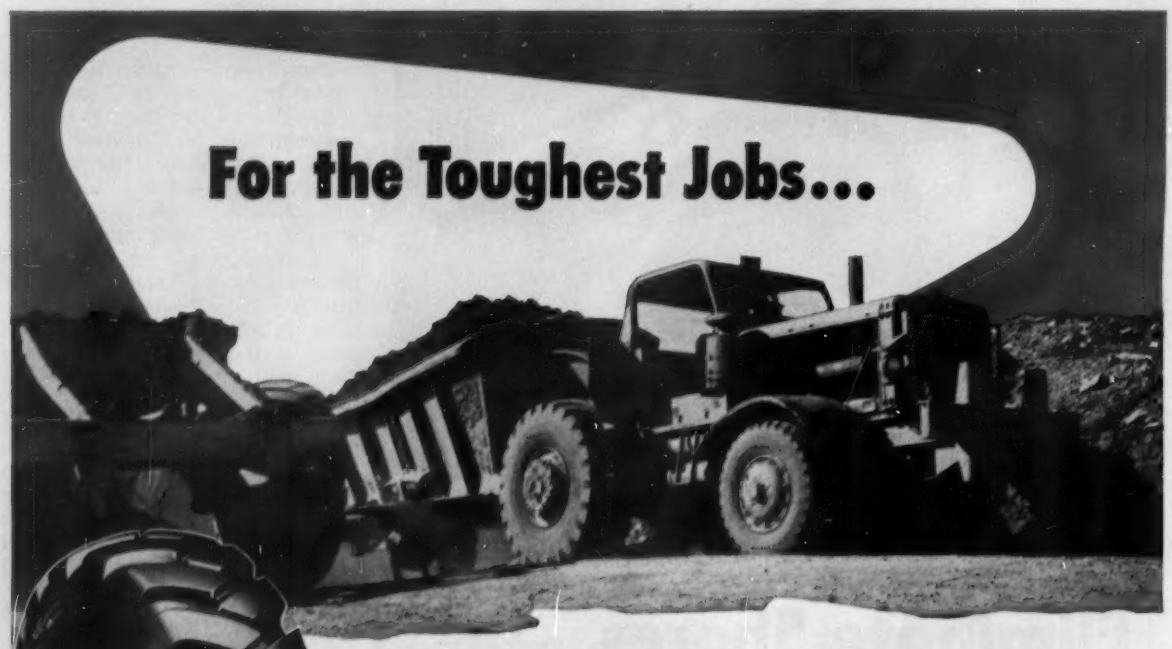
Ragnar Benson will get up to three reuses per beam and, when this job is completed, may use them on other jobs. If no reuse is possible, the contractor can scrap them with little loss in purchase price.

Jones & Laughlin furnish the beams unfabricated. The contractor used several fabricators to fit the adjustable flanges and other parts to the beams. The two that did most of the work are Standard Metal Products, Braddock, and Keystone Fabricating Company, Pittsburgh, Pa.

LIGHT WEIGHT of beam makes it easy for two workmen to carry it.

SLIDE BRACKET at beam end permits adjustments in length up to 2 ft.

# For the Toughest Jobs...



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**BUILDS THE TOUGHEST TIRE LINE-UP EVER PRODUCED!**

Unexcelled for strength with *exclusive* Nygen Cord, and for ideal crawler-like traction and flotation, The General Tire makes every off-the-road job show a profit. Built big, broad and rugged, they provide utmost protection against job hazards . . . keep units consistently on the move to get jobs done faster.

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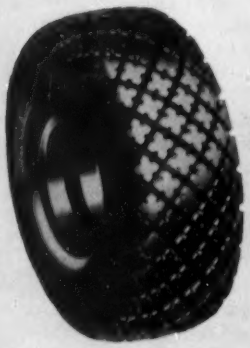

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Wickwire Rope distributors are men who wear many hats. They are at home in the headgear typical of the numerous and varied industries they serve—the marine and fishing trades, the oil fields, construction, logging and many other industries having specialized wire rope needs.

These men aren't hat models—they can wear these hats because of their long experience in the industries they serve. Add to this their intimate knowledge of local conditions and their comprehensive Wickwire Rope stocks, and you'll see that your Wickwire Rope distributor is the man who can be of great help to you.

Yes, your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

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Cord plies spirally applied in *opposite* directions, for highest flexibility

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## *it's the U. S. Royal Cord Air Hose!*

Built like a tire—and *tough as a tire*, with a special construction found in no other air hose:

- *Exclusive.* Two counter-spiralled plies of tough special cord floated on resilient rubber for outstanding strength, shear resistance and flexibility.
- Braided cotton breaker ply anchors the tube to carcass *permanently.*
- Tube is high-quality neoprene for maximum hot oil resistance.
- Tough, brown natural rubber cover gives excellent resistance to cuts and abrasion—protects unique construction under extreme service conditions.

U. S. Royal Cord Air Hose has a very high hydrostatic value, with a minimum of contraction or elongation. It is so tough and flexible that it needs no cribbing, can be run over repeatedly by heavy machines without harm. The "hose that's built like a tire" is obtainable in continuous lengths from any of our 27 District Sales Offices, or write Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

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Mechanical Goods Division

**United States Rubber**

# Rock Makes Rail Relocation Tough, Costly, Tedious Job

TRAIN STEAMS past on existing track while Northwest shovel with 2½-yd bucket digs through rock bluff for new line. Careful planning avoids interrupting train schedules.

RUGGED ROCK is just another obstacle to construction men relocating a railroad line around the future reservoir of The Dalles Dam in Oregon. But it makes the job tough, costly, and tedious.

The 14-mi relocation will be the new main line of the Spokane, Portland, and Seattle Railway. Morrison-Knudsen Co., Inc., has the job under a $2.4 million contract with the Corps of Engineers.

Work involves moving 1,400,000 cu yd of basalt rock that does not behave in any predictable pattern when drilled and blasted. Instead of shattering, it breaks into massive chunks along deeply hidden seams.

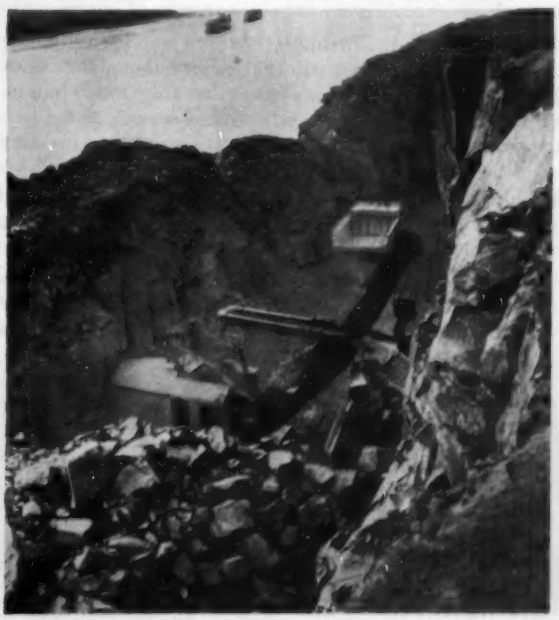
In addition, nearly all of the new grade runs through bluffs directly above SP&C's busy existing tracks. Blasting operations must be sandwiched between the passing of 10 to 15 trains a day.

When the track below the work area is free of traffic, a protective blanket of planks and sand is spread over it. After the blast, a shovel clears away the blanket along with any rock that spilled on it from above.

To blast through this tough rock, Morrison-Knudsen is using about ½ lb of dynamite for every cu yd of rock removed. That will add up to nearly 400 tons of explosive before the job is completed.

Despite difficulties, Morrison-Knudsen is moving a steady 6,000 to 7,000 cu yd in two daily nine-hour shifts. M-K has moved more than 800,000 cu yd of excavation and practically completed about 8 mi of the new grade. The job is scheduled for completion in August. In addition to grading, the contract calls for all tie and track laying and ballasting.

Eugene B. Potter is project manager; William Anderson is general superintendent; and George J. Schoch is resident engineer for the Corps of Engineers.



SHOVEL FIGHTS through 70-ft-deep rock cut alongside Columbia River. Euclid dump trucks of 17 cu yd capacity remove material.

WAGON DRILLS BORE holes for a blast to open the cut through the rock. Drills are self-propelled Gardner-Denver Airtracks.

**All-wheel traction.** With the extra traction of its 4-wheel drive, the 'Jeep' Truck is an all-purpose, performance-proved workhorse for moving men, tools and equipment to or around construction sites. It carries more than a ton of payload, on the road or off—in low-low gear climbs grades as steep as 60°, fully loaded—tows heavily-loaded trailers where other vehicles can't go.

# Contractors save time and manpower with 'Jeep' versatility and all-wheel traction!

**Transportation.** The 4-Wheel-Drive Universal 'Jeep' is always on-the-go—whether carrying engineers for initial surveys, speeding men, equipment and tools to construction assignments, or providing transportation for final inspection work.

**Mobile power.** Taking power to the job, on-the-road or off, is simplified with a rugged 4-Wheel-Drive 'Jeep' Truck equipped with power take-off and crane, or other specialized equipment. It also operates welders, compressors and generators.

In every phase of construction, whether travelling through deep fill with men and tools, or operating earthmoving equipment, 4-Wheel-Drive 'Jeep' vehicles save time and manpower, help keep work on schedule every day of the year, good weather or bad.

These time-tested rugged vehicles provide a mobility and range of performance that is unmatched. The extra traction of their 4-wheel drive provides the go-anywhere power that keeps tough jobs moving. 'Jeep' vehicles go where other vehicles can't in the heavy, rough going of the construction project. Then, on the highway, a flick of the selector lever shifts them into conventional 2-wheel drive for travel at top legal speeds. With power take-off or hydraulic lift, they provide on-the-spot power to operate many types of equipment from dozer blades to back hoes.

Economical 'Jeep' vehicles supplement heavy-duty equipment, spread their cost over a wide variety of jobs, give you additional savings through long life and low maintenance costs. Ask your Willys dealer for a practical, on-the-job demonstration.

**The 'Jeep'®**

**family of 4-wheel drive vehicles**

**WILLYS... makers of the world's most useful vehicles**

WILLYS MOTORS, INC., TOLEDO 1, OHIO

# RUGGED WAGNER EQUIPMENT

## makes a tractor your most versatile and inexpensive construction tool

Now a tractor can be the most important single tool on your construction jobs. When it's teamed up with rugged Wagner tractor equipment, nothing else can do so many jobs so well.

By equipping a tractor with a Wagner Backhoe you make short work of digging footings, sewer, gas and power trenches and septic tanks. Likewise a tractor and a Wagner loader do a faster, better job of land clearing, excavating, backfilling and landscaping. And all the while you'll be speeding construction, saving man-hours and increasing profits.

Check with your nearby Wagner dealer to see how Wagner tractor equipment can cut time and labor costs on your construction jobs.

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**"WAGNER BUILT" MEANS "BETTER BUILT" FOR OVER 105 YEARS**

1. CONVERTING CAISSONS into usable foundation meant making them completely watertight. This required extensive underpinning, caulking, and patching in and around heavy networks of spur and cross-lot braces set to support walls while work was underway.

# Reusing Caissons Saves $500,000

**Contractor salvages ancient concrete caissons and converts them into dry-land cofferdam and foundation for New York skyscraper.**

**ANDREW BORACCI**
Associate Editor

CONVERTING half-century-old concrete caissons into a combination dry-land cofferdam and foundation is saving an estimated $500,000 in foundation costs on a 27-story skyscraper at 20 Broad St. in New York's financial district.

The conversion eliminates the cost of erecting a steel sheet-piling cofferdam to hold back ground water. And it enables Slattery Rock Corp. of New York to make use of existing caissons. The foundation job had been estimated at $1.5 million; but it will cost only about $1 million.

Making the changeover isn't easy. It involves underpinning, demolition, excavation, caulking, waterproofing, and new concrete work. To make the job doubly tough, Slattery has to do all this in and around heavy networks of diagonal and cross-lot bracing which support adjacent streets and the New York Stock Exchange building next door as excavation progresses.

Two 57-yr-old buildings rested on the caissons: the Commercial Cable Building and the Blair Building. Their combined foundations measure 125x150 ft, the dimensions of the new building. Caissons on the foundations' perimeter were 30 to 40 ft long, 5 to 6 ft wide, and up to 30 ft deep. Interior caissons were both rectangular and circular. Except for a break of about 100 ft, perimeter caissons joined each other.

Before tackling the foundation, Slattery's work force, superintended by Dudley Saunders, installed the first of four tiers of temporary horizontal spur braces diagonally at the corners of the building where interior foundation walls would be freed by demolition. This was done before the completion of superstructure demolition.

Saunders cut three parallel trenches in the concrete floor slabs —diagonal to the foundation corners—to serve as seats for three 12-in. WF 75-lb brace beams.

**2.** CONTRACTOR PLACES first of four tiers of spur braces at building corner even before demolition is finished.

**3.** CAISSON FOOT is undermined to remove ancient timber work-chambers used in original pneumatic driving of caissons.

**4.** WORKMEN FORM excavated portion of caisson behind timber placed temporarily to support shaft until it is underpinned.

**5.** LABORERS REMOVE forms after caisson underpinning is complete to allow concrete to shrink fully. They drypack voids.

6. UNDERPINNING CONTINUES in and around temporary braces placed at the feet of the caissons to support them against outside pressures. Permanent braces go in later.

7. RULER INDICATES width of gap caused by original faulty pouring of concrete. Many gaps were found along entire face of caissons. All required cutting back and drypacking.

8. CROSS LOT BRACES SUPPORT new cut-off walls poured in two sections of job which did not have caissons. Foundation required these walls before it could be made watertight.

Pockets then were cut into the caisson walls and fitted with two 1-ft-sq steel bracer plates separated by steel wedges. Workmen hammered home wedges after beams were in place. Cross braces tied the beams together and prevented them from being jarred loose accidentally.

### Underpinning

With the first tier of diagonal bracing in place, workmen cut exploratory holes through brick veneer covering and steel casings at the feet of the caissons. There they discovered timber work chambers imbedded in the feet of the caissons and extending almost the full perimeter of the building. The chambers had been used in the original pneumatic construction of the cassions. (The process was required by the high level of ground water.) They would have to be removed, along with the concrete that held them. This meant underpinning nearly the entire caisson perimeter while, at the same time, preventing any entry of ground water.

Saunders underpinned in alternating 5-ft sections. Timbers and concrete first were removed to within 1 ft of the outside caisson face. This portion was left to retain water during underpinning. The alternating sections next were formed up along their faces to within a few inches of the top. Then 3,500-psi concrete was poured and permitted to set for about seven days to allow maximum shrinkage before forms were removed and voids at the top drypacked. Remaining sections then were mined and underpinned the same way.

During the underpinning, Slattery's crews took advantage of working that deep to prepare for later demolition and excavation of remaining portions of the foundation. They placed temporary raker braces along the feet of the caissons to take horizontal loads which outside embankments would exert when the supporting interior concrete floors later were removed. The braces were simply WF beams of various lengths wedged against the inside faces of the caissons on one end and against the basement slab and bedrock on the other.

### Excavation and Demolition

Once the perimeter caissons were underpinned and temporarily braced, Slattery began demolish-

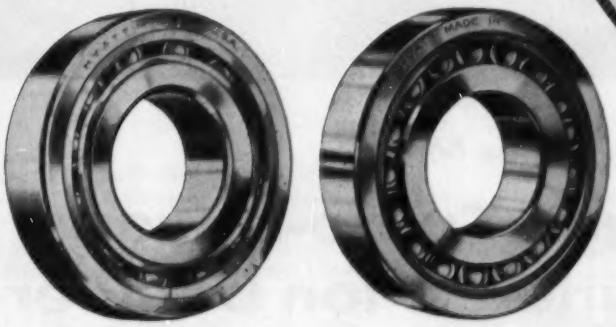
*(Continued on page 110)*

# HOW TO REPLACE A HYATT BEARING

**by HY WHEELER, the sage of the socket wrench**

The big thing to remember, brother, is to *always* replace a HYATT with *another* HYATT of the same type and size. You know why? Because HYATTS are so precision-built they're *completely interchangeable.* You don't have to change the shaft or bore diameter a bit. This saves you trouble and keeps the boss happy, too, by making sure he gets his money's worth!

When you're ordering a replacement HYATT, just be *sure* to get the right one, either from the parts list put out by machine builders, or put down on your order all the markings from all the bearing parts.



**And when the new bearing comes, *be sure it's in this familiar blue and yellow box.* When it comes to *quality,***

**there's no substitute for . . .**

# HYATT ROLLER BEARINGS

STRAIGHT ○ BARREL ○ TAPER ○

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

*No more broken plows on this boulder . . .*

# New Michigan Turbo-Dozer roots out buried 2-ton boulder

When these pictures were taken, the 2¾-yd. Michigan Turbo-Dozer had just finished clearing some wooded farmland to open up more acreage for cultivation. The farmer asked the Turbo-Dozer operator if he'd try to remove a certain boulder which lay completely buried in the wet loam—he'd broken two plow blades on it, and he'd never even budged it with a tractor. This job—which took the Turbo-Dozer 5 minutes—illustrates what you can do with the Michigan's exclusive power-tilting bowl.

## Cut and pry with power-tilting bowl

Two lateral cuts on the front and back sides of the boulder exposed approximately six inches of stone. Then, crowding in against it, the operator hooked the cutting-edge of the bowl under a projection on the stone—and worked the bowl back and forth through a 33 degree arc to pry it loose. When the boulder loosened, he crowded forward as he raised the bowl—literally *lifted* and pushed the boulder out of its hole. With the bowl tilted forward in "float" position, he skidded the boulder to the dump.

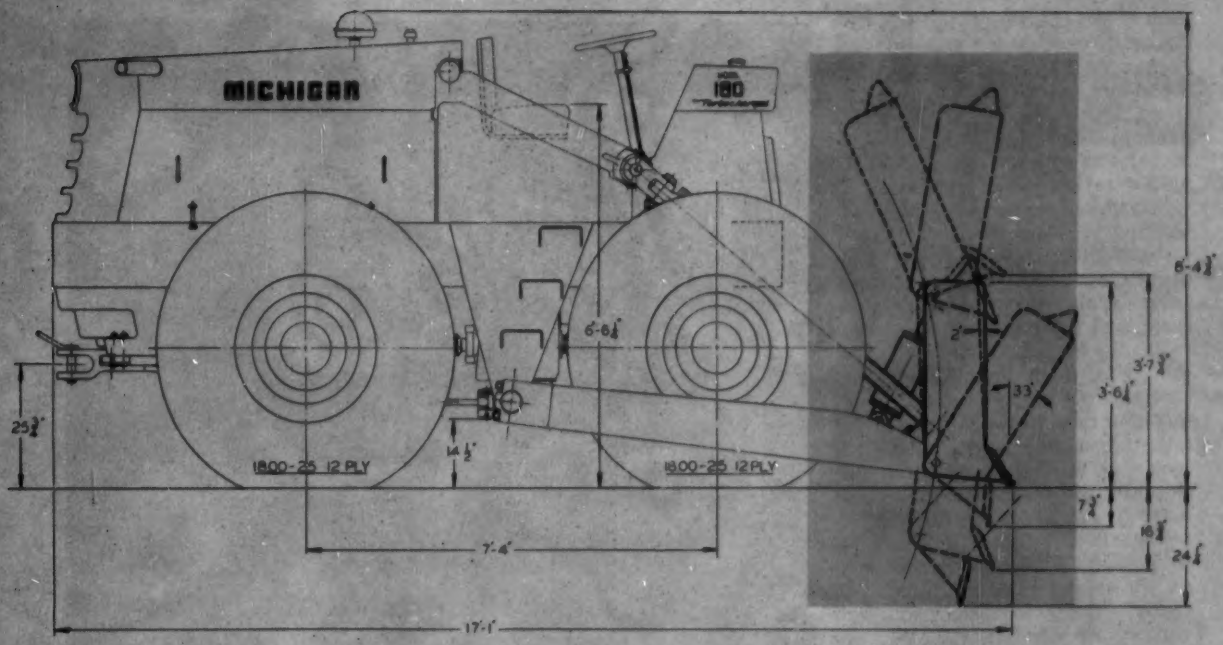
## Full 4-wheel traction on turns

In addition to its power-tilting bowl, the new Turbo-Dozer features rear-wheel steering. You don't brake or scuff your wheels on a turn: *all four wheels are always driving,* except when you declutch the steering-drive axle for highway travel. There's no unnecessary tire wear, no loss of load or power on turns. In land clearing, you can doze a load downhill and turn it into a tight spot—and still have power to pull yourself out with your wheels cramped the way you went in. The oscillating rear axle keeps both wheels on the ground on uneven terrain.

## Torque converter, power-shifting standard

Clark's exclusive power train—3-to-1 torque converter, power-shift transmission and planetary-wheel drive axles—

*(Advertisement)*




**Power-tilting bowl.** A 6-inch double acting hydraulic cylinder tilts the bowl back and forth through a 33 degree arc. The operator can change the bowl angle from "dig" to "float" while travelling. He can hook the cutting edge under obstructions and work the bowl back and forth to pry them out. Two 6-inch lift cylinders provide tremendous lifting power and down-pressure, from 24 ¼" below ground level to 43" above.

is standard equipment on the Turbo-Dozer. There are four speeds: zero to 27 mph, forward or reverse. The torque converter automatically gives you up to 300% torque multiplication as the load gets heavier. You can't stall the engine, and there's no clutch to slip. With two power-shift levers on the steering column, you can instantly shift between High-Low and Forward-Reverse when moving in either direction.

## 20-page photo booklet

You'll find a full description of the power-tilting bowl, heavy-duty C-frame, power train and specifications in a 20-page photo booklet—write for a copy. The new Turbo-Dozer combines rubber-tired speed with outstanding traction and power—165 hp turbocharged diesel, 28,000 lbs. maximum rimpull on 18.00-25 low pressure tires or optional 23.5-25. For faster cycles, more yardage or tonnage in every shift, take a look at the new Michigan Turbo-Dozer.

Michigan is a reg. trade-mark of

CLARK EQUIPMENT

**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**
**2403 Pipestone Road**
**Benton Harbor 21, Michigan**

Below: **Compare this photo** with the large picture. Here the boulder has been brought up to the surface, and the operator has tilted the bowl forward to "float" position to carry it away. The oscillating steering-drive axle keeps both wheels in firm contact with the ground on uneven terrain; locking differential is standard.

ing and excavating the interior portions of foundation which would not be reused. Two cranes at street level dug out while jackhammer and blasting crews broke up interior concrete slabs and unusable caissons into rubble.

Saunders ran into an unusual blasting problem. He had planned to blast interior caissons piece by piece from top to bottom as excavation progressed. But the steel casings of the caissons caused him to change his plans. When the first shot was made, explosive pressure sheared off the casings' rivets and shot them through the air like bullets. Saunders eliminated this hazard by mining down and around the caissons to their bottoms, which were free of casings, and blasting at their bottoms to topple the caissons over. Workmen then burned off the steel jackets and jackhammered remaining concrete into rubble. Second and third tiers of diagonal spur bracing were placed as excavation proceeded.

### Cut-Off Walls

Non-caisson areas on the job were a 55-ft stretch on New St. and a 45-ft section on Broad St. Cut-off walls had to be poured in these areas to make the cofferdam into a single, dry unit. These walls were 5 ft thick and up to 30 ft deep.

Steel sheet piling first was driven on the outside to support the bank and act as exterior forms for concrete. Then wood inside forms were braced against the remaining, undemolished sub-structure. After concrete was poured, two truss-type, cross-lot braces were set to retain the embankments. The braces were 10-in. WF 49-lb and 14-in. WF 184-lb beams set on temporary H-piles driven to bedrock as columns.

### Waterproofing

The cofferdam now was a solid unit but it still had to be made watertight. A serious source of possible water leakage was the caisson joints. Repairing the caissons' joints meant providing drainage chases which would divert water to sump pits. Saunders chiseled a vertical 16-in. slot, 1 ft wide up along the joint. This exposed a portion of the steel casing which then was burned off. The slot was filled with concrete to within 6 in. of the inside caisson face. This 6-in. space then was sealed with 4-in. brick, purpose of which was to leave a 2-in. chase be-

*(Continued on page 114)*

**9.** BRACES REST on temporary H-piles driven to bedrock. Piles later will be burned off when bracing is to be removed. Workmen under braces prepare slab for concrete pour.

**10.** LABORER JACKHAMMERS old concrete free from wall columns which later will be removed to prepare for placing of new concrete to bring walls up to required grade.

# STOP VARNISH!

Refill now with Sinclair SUPER TENOL® Motor Oil for top protection against harmful varnish in your Diesel engines.

No matter how rushed the job, SUPER TENOL protects your engine against the effects of high temperature, over-loading and *continuous stop-and-go.* Your Diesel stays on-the-job longer, with less wear . . . fewer repairs.

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Only $64.50

## MORE SAW FOR YOUR MONEY —AND WE CAN PROVE IT!

1. *Extra* capacity! Comes with 6½" combination rip-crosscut blade. B & D KRO-BIDE blades available for every possible job requirement!
2. *Extra* power! Custom-built motor for heavy-duty sawing — runs cool, without stalling, with no faltering in those "tough" spots!
3. *Extra* safety! Telescoping guard; larger lift-lever; instant release trigger switch with guard; open-end handle; grounding wire in cable!
4. *Extra* adjustment features! Larger wing nuts are out-of-the-way, give fingertip depth and bevel adjustments—safe, easy, positive!
5. *Extra* convenience! Clear view operation; sawdust blown away from operator *and* work!

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## Races through a 2x4, even at 45° angle, with blade to spare—lots of blade for repeated sharpening!

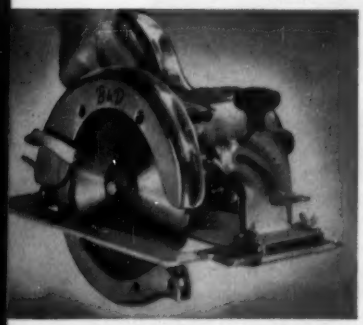
### B&D power-built motor gives extra "bite"...for toughest jobs!

A rugged, power-balanced addition to the famous B&D saw line! Remember, we don't buy motors, we *build* them! Each Black & Decker motor is specially built for the job it must do—and the motor in this new 6½" heavy-duty saw is custom-built to give you *more* stamina, *more* sawing "guts" than you'll need! Priced so low that no real pro should ever be without it!

### Performs on the job like famous B&D 7", 8", 9" H. D. models!

Extra capacity—makes all cuts in 2 x 10 and smaller lumber; cuts 2½" depth at 90° . . . cuts 1⅞" at 45° . . . handles practically any building material: hardwoods, Transite, ceramics, tile, etc. Unsurpassed for depth and bevel cutting—quadrant calibrated for precision adjustment; larger wing nuts; larger steel shoe and cutting guide permits safe sawing from either side!

Address: THE BLACK & DECKER MFG. CO., Dept. 2603, Towson 4, Md.



Power-built to take rough usage. Runs cool, even when cutting intricate patterns in 2 x 4 stock, practically any building material. Full 1" stroke. Armature and gear shafts mounted on ball bearings. Minimum vibration, *extra* smooth performance. Cuts to 45° angle . . . either side. *Lowest price in the field.*

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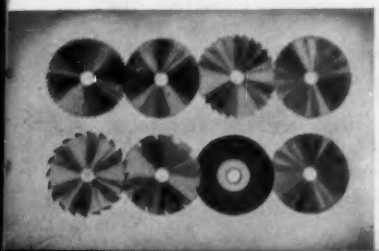
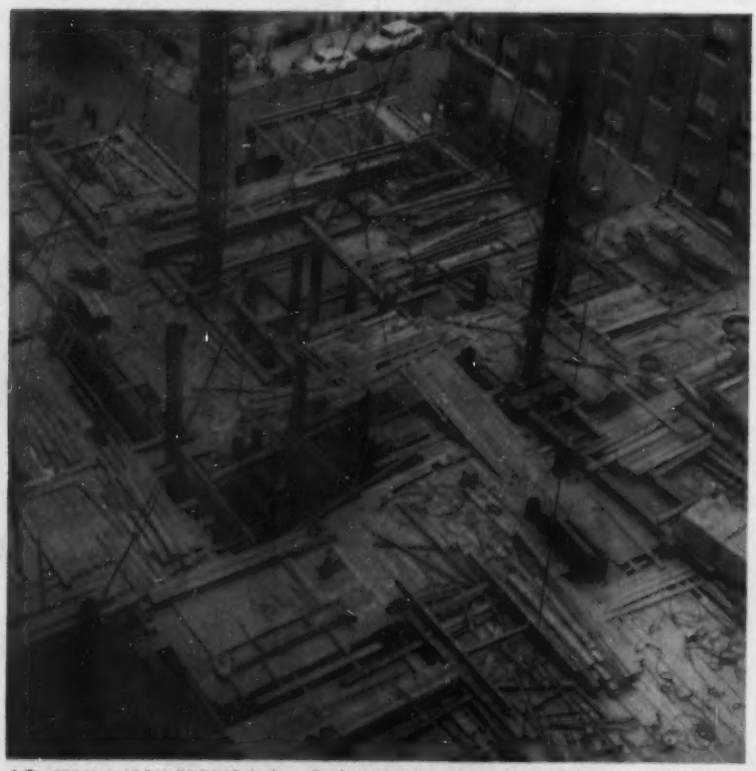


Exclusive! Fully adjustable shoe for cuts 0° to 45°—cuts up to 1¾" at 45° on either side of shoe! Full line of wood and metal cutting blades available!

11 EXPLOSIVE TEARS apart the bottom of one of last remaining caissons which required removal. Job had many old caissons not needed for the foundation conversion.



12 STEEL WORK BEGINS before final trimming and patching of foundation. Structural steel will rise 27 stories. All connections are made with high tension bolt to reduce noise

hind to divert downward any water leakage through the concrete plug.

Horizontal voids also were discovered along the faces of the caissons. These were a result of original faulty pouring of concrete. To caulk them, Saunders jackhammered out a 1-ft pocket wherever a void appeared and filled it to within 1 in. of its top with concrete. Once full shrinkage had been achieved, the void was drypacked

Caissons then were cut down to required elevation and new concrete walls placed where needed to meet plan requirements.

### Permanent Braces

Saunders next replaced temporary braces at the cassion bottoms with 14-in. WF 127-lb permanent ones. This was done by pouring a concrete footing, anchored with bolts to bedrock, several feet in from the caisson wall. The footing and the caisson face both were provided with pockets to receive the brace. Once the brace was placed and wedged tight, the pockets were concreted to prevent the beam's being jarred loose.

Danger still remained of ground water punching out plugs, patches, and underpinning. To prevent this, a 2-to-7-ft thick liner wall, 18 to 28 ft high was poured along the entire inside face of the old caissons.

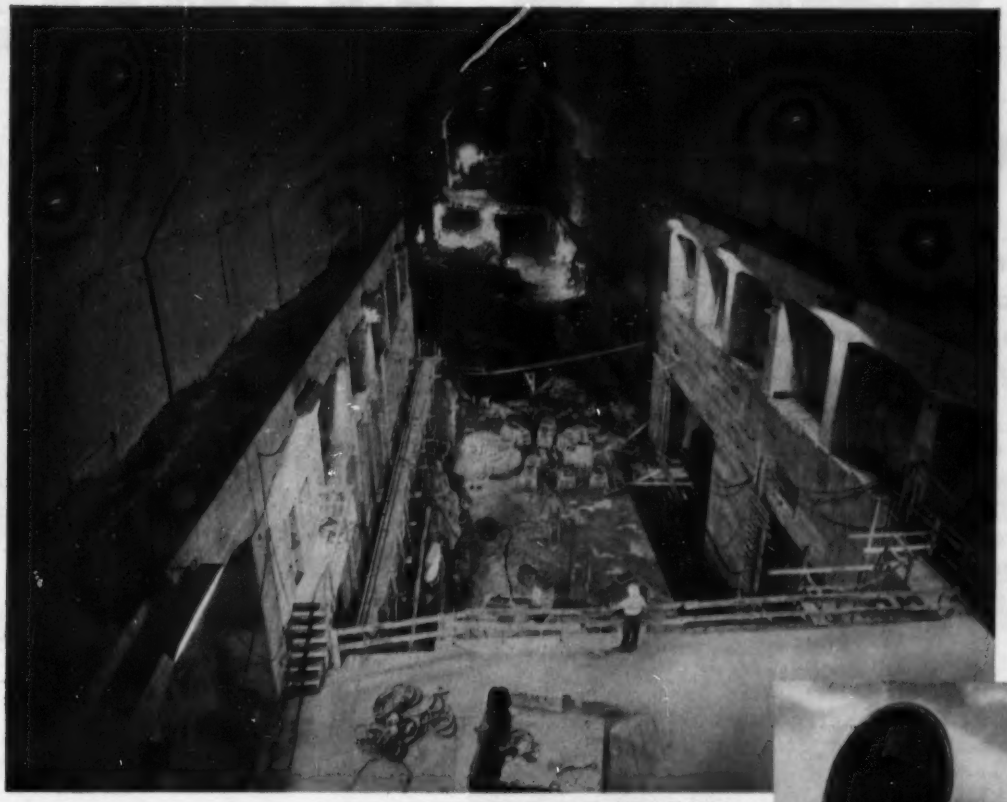
### Drainage Course

Next to be provided were a 6-in. sand filler and 12-in. gravel drainage course over the bottom of the entire area to carry water from the bricked-up wall chases to sump pits. A 6-in. concrete slab followed, along with machine foundations and inside footings.

Temporary spur and cross lot bracing remains until after the first floor slab is poured. It then will be cut into small pieces and carried out through slab openings.

Slattery is subcontractor for the George A. Fuller Co., the general contractor, who is erecting the building for the General Realty and Utilities Corp. John F. McCarthy is Fuller's superintendent. Foundation design and the basic construction procedure followed by Slattery were developed by the consulting engineers, Moran, Proctor, Mueser & Rutledge. The firm's resident engineer was Edmund Burke. Kahn & Jacobs and Sidney Goldstone are the architects.

# *Slash* costly pitting and patching



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### for all Concrete Forms →

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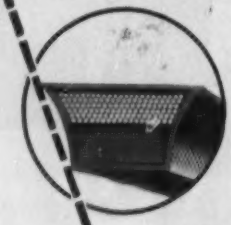
**Here are the interesting reasons why Gates Super Vulco Ropes stand up months, even years longer than *any* standard V-belts...**

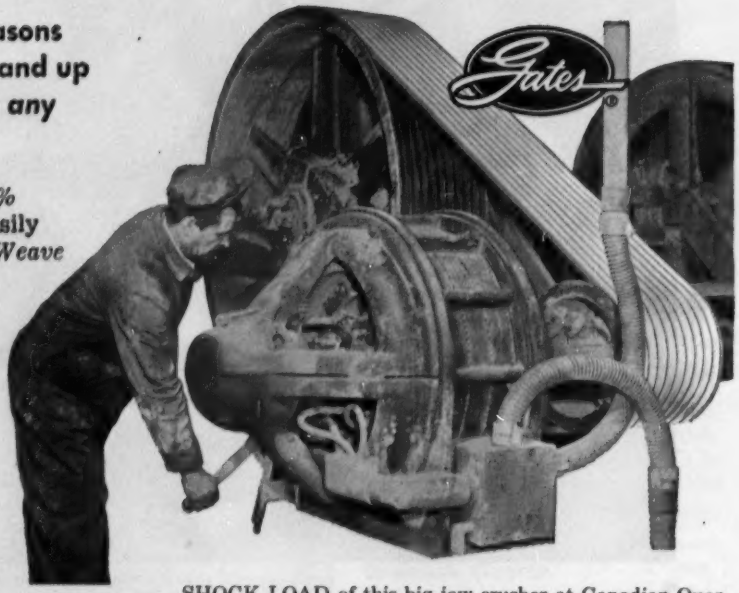
**1.** *Super-Strength Cords* provide 40% greater horsepower capacity . . . easily absorb heavy shock loads. **2.** *Flex-Weave Cover* (U.S. Pat. No. 2519590) provides greater flexibility with far less stress on the fabric. Cover wears longer — increases belt life, lowers belt costs.

**3.** *Concave Sidewalls* (U.S. Pat. No. 1813698) provides sure pulling power, longer wear because sides straighten out as belt bends— make even contact with sheave walls.

Straight-sided belts bulge out when bent around sheave

Uneven contact causes uneven wear.






SHOCK LOAD of this big jaw crusher at Canadian Quarries, Ltd. is absorbed by Gates Super Vulco Rope Drive. Wherever shock load is severe, Gates Super Vulco Ropes cushion the shock—keep machinery replacement cost down.

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**Resists Oil, Heat and Weather:** Long life is assured even in the presence of excessive oil . . . even under prolonged exposure to heat and weather.

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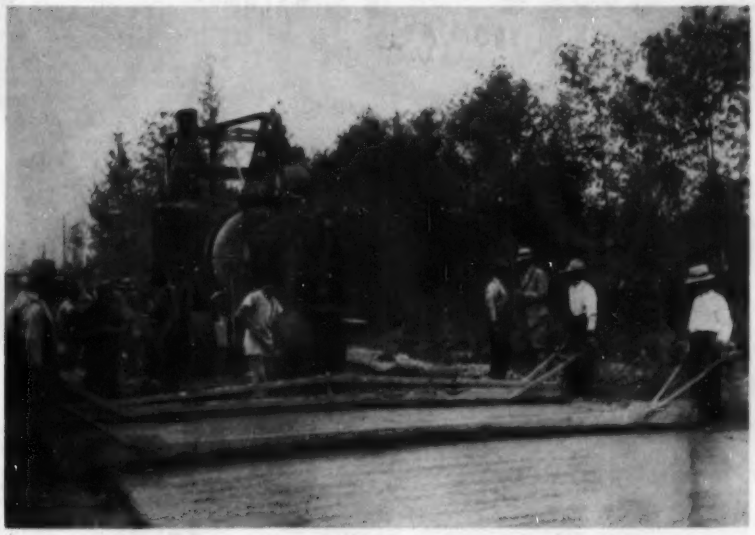
*World's Largest Maker of V-Belts*

# Gates SUPER Vulco Rope

## *The V-Belt with 40% more horsepower capacity*

TPA 57

# PAVING...How to Get the Best Results



**THIRTY YEARS AGO** steam boilers powered pavers, spreading and finishing was almost entirely done by hand, and forms were just wood planks backed up by dirt.

**TODAY** pavers have more than twice the output of those in use 30 years ago. They incorporate a variety of automatic features to reduce hand work to a minimum.

## Hauling, Mixing Concrete

By LEO M. ARMS, Manager,
Highways & Municipal Bureau,
Portland Cement Association

BOTH SITE-MIXED and ready-mixed concrete are used on paving projects. As used here, ready-mixed concrete is a general term which covers concrete mixed in a truck-mounted drum after leaving the batching plant, as well as that mixed at a central plant and transported to the job either in agitators or in non-agitating dump trucks.

The location of the proportioning plant is of equal or more importance than proper plant layout in its effect on construction costs. If the aggregates arrive by rail, it will almost always be more economical to locate the plant at a suitable site where a siding of adequate length is available. This set-up permits the aggregates to be handled from cars to stockpile or bins by one crane.

More frequently cement is delivered by rail, and one or more of the aggregates are trucked to the job. Under these circumstances, a careful analysis of handling and hauling costs for various plant locations will pay dividends by insuring that the layout selected will give the lowest total cost for materials delivered to the mixer.

Another problem is the advisability of using more than one set-up on fairly long projects. The cost of hauling from one location must be compared to the lower cost of shorter hauls from two locations, plus the cost of moving the batch

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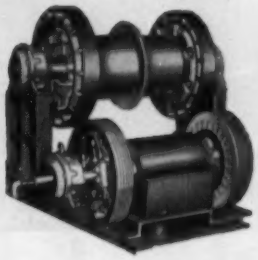

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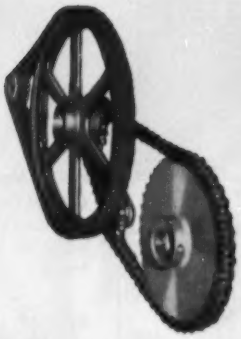

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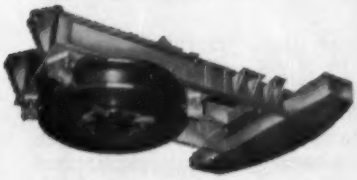

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Heavy, fully machined, hard steel rollers and roller path. Large, sturdy cast steel and electrically welded machinery frame. Perfectly balanced design assures minimum stress and absolute alignment to shafts, bearings and swing table gear.

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Daily grease fittings centrally located on cab panel. Intermittent grease fittings easily accessible. Positive grease and dirt seals at all revolving points. Force-feed, filtered, circulating lubrication on all chain and sprocket drives and on main shaft bearings. Main bearings also running in oil.

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Self-aligning, anti-friction bearings on all high-speed, continuous, rotating shafts and drums. Special long-life, alloy bronze bearings on swing rollers and center rotating sleeve.

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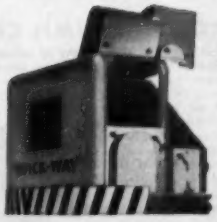
All operating controls, including instrument panel and lock throttle, conveniently located in front of operator. Safety glass windows on all sides and top insure full vision—sliding and hinged windows provide maximum ventilation.



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**PAVING...**
**Continued from page 117**

plant, including overhead. Use of two or more locations on long projects has the advantage of reducing the number of batches which may be on the road when emeragency shutdowns occur.

The number of batches carried per truck has tended to increase during the last few years. One factor has been the increased number of six-wheel trucks used. Another is that modern trucks, through improved weight distribution, have greater load-carrying capacity

**BATCH TRUCKS and paver operate between the forms. Subgrade scraper insures proper subgrade elevation. The maul is used to free material which may not discharge.**

Allowable axle load, tandem axle load, and gross vehicle weights vary from state to state. The most economical combination depends on the area in which the equipment is used. For example, maximum allowable axle loadings for six-wheel single-unit trucks are the same in Illinois and Indiana, but the maximum allowable gross vehicle load is 50,000 lb in Indiana and only 41,000 lb in Illinois. This is equivalent to restricting the maximum load on the front axle to 9,000 lb in Illinois when the truck is loaded to the maximum allowable tandem axle load of 32,000 lb, whereas 18,000 lb is permitted on the front axle in Indiana.

The weight of dry batches of commonly used pavement mixes is about 3,850 lb per cu yd. So the weight of a 37.4 cu ft batch is about 5,350 lb, and a 29.7 cu ft batch weighs 4,250 lb. When about 4,000 lb for a three-batch body and hoist is added, the total gross carrying capacity required for three-batch trucks is approximately 20,000 lb for 37.4 cu ft batches and 16,750 lb for 29.7 cu ft.

Batch dividers should fit closely to the sides of the body and must be high enough to keep the batches separated even when the truck is in the fully raised position. They should be equipped with individual positive latches so that only one batch at a time is dumped into the mixer skip. A simple method is to suspend the dividers from an eccentrically mounted rod and weld stops to the floor of the truck body, preventing the gate from swinging open when it is lowered into the locked position. To release the gate, the rod is rotated and thus raised so that the bottom clears the

*(Continued on page 125)*

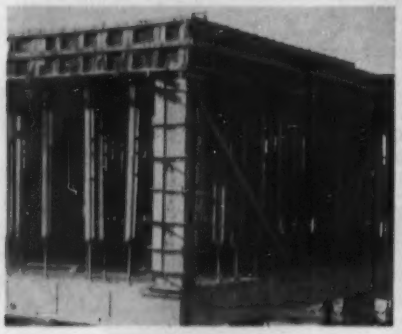

when shoring needs bracing

**ROOSHORS**

make it easier

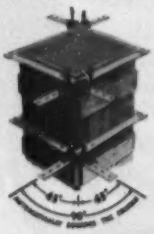
**WOODEN UPPER MEMBERS**

Ever try to drive a nail through bracing to hit a set hole in a metal pipe? Then you, too, would appreciate the ease in nailing bracing with ROOSHORS...their wooden upper members are the answer. The new ROOSHOR, extension type, actually gives you three shores in one . . . a *flat-head* shore, a *male-head* shore and an *extension* shore, by merely inserting any length 4 x 4 in the steel head. *More ROOSHORS have been used than any other adjustable shore!*



**ROOS COLUMN CLAMPS**

For speed and economy in column forming, Roos Column Clamps have six distinct advantages • two identical units • open either way • larger bars give greater strength • no loose parts • cannot be put on wrong • only hammer needed to tighten. ROOSHORS AND ROOS COLUMN CLAMPS are available for rental with purchase option from warehouse stocks in principal cities. Write for Bulletin 456.



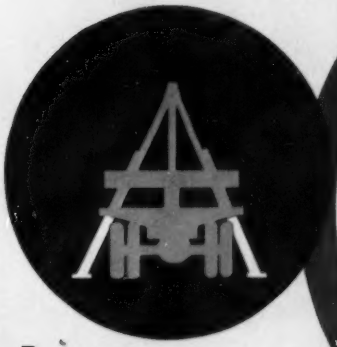
MAIL THIS COUPON TODAY!

Baker-Roos, Inc.
P. O. Box #892, Indianapolis 6, Indiana CM.
Gentlemen:
Please rush additional information, without obligation, on Rooshors and Roos Column Clamps.

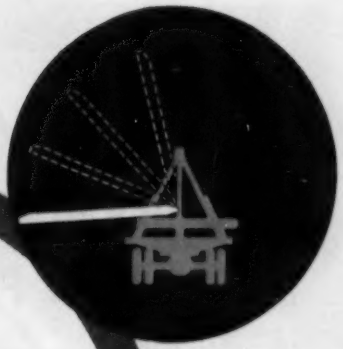
Name_____
Company_____
Address_____
City_____ State_____

# *New* HYDRA-LIFT *features...*

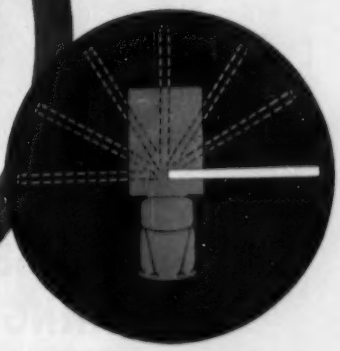
## four All-hydraulic Operations!



**1.** Outrigger Placement



**2.** 100° Boom Hoist



**3.** 180° Boom Swing

**4.** Telescopic Action of Boom

**HYDRAULIC TELESCOPIC BOOM*** gives you amazing load-handling versatility. Telescopes from 17 to 27 feet. Powers full-capacity loads into and out of tightest spots. Does jobs you used to say couldn't be done with a crane. Hydra-Lift gets lifting jobs done twice as fast, speeds up work of your entire crew.

*Hydraulic Telescopic Boom Optional. Standard Boom Is Tubular, Telescopes Manually 12′ to 17′ to 22′.

**ONLY 40 INCHES BEHIND CAB**—Hydra-Lift lifts up to 6500 lbs., yet requires only 40" behind truck cab. Hydra-Lift can load and unload its own truck bed. Installs easily on any truck two tons or larger. It's part truck, part crane, with the usefulness of both at a fraction of the cost.

## SIMPLE WRIST ACTION

Thanks to smooth dependable hydraulic power, every boom action — plus operation of outrigger legs — is accomplished by easy movement of simple push-pull levers. Load-line is operated by easily-engaged power-up, power-down winch. No difficult foot-and-hand coordination. No jerking or slipping of load. Controls inside the truck, outside or both.

Please send me full details on the Pitman Hydra-Lift, Model 60.

Name_____

Company_____

Street_____

City_____ State_____

**PITMAN MANUFACTURING COMPANY**

300 W. 79th Terrace Kansas City, Mo.

# Now...

## One line to specify for LOWER COST PAYLOADS!

**Gar Wood -St. Paul-**

## HYDRAULIC HOISTS *and* MATCHING BODIES

## Today's newest, most advanced line of equipment

The two most famous names in truck equipment—Gar Wood and St. Paul—now identify *one* advanced line of hydraulic hoists and bodies!

Consider what this means to you in terms of engineering know-how behind the truck equipment you specify. Gar Wood invented the hydraulic hoist . . . St. Paul developed it. Now this combined experience is reflected in such product advantages as smooth, efficient operation . . . long, trouble-free service life . . . a minimum of maintenance attention.

Consider what this consolidation means to you in terms of better availability and service. Now one world-wide sales and service organization of leading truck equipment distributors can provide you with bigger values and better service. Your nearby Gar Wood-St. Paul distributor also offers prompt, dependable service on any Gar Wood or St. Paul equipment you may already own.

Before you specify *any* truck equipment, get all the facts about today's newest and most advanced line. Call your Gar Wood-St. Paul distributor, or write to Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

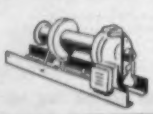
**GAR WOOD INDUSTRIES, INC.**

Wayne, Michigan • Richmond, California

Plants in Wayne and Ypsilanti, Mich. • Findlay, Ohio • Mattoon, Ill. • Richmond, Calif.

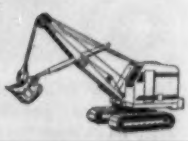
Gar Wood Truck Cranes

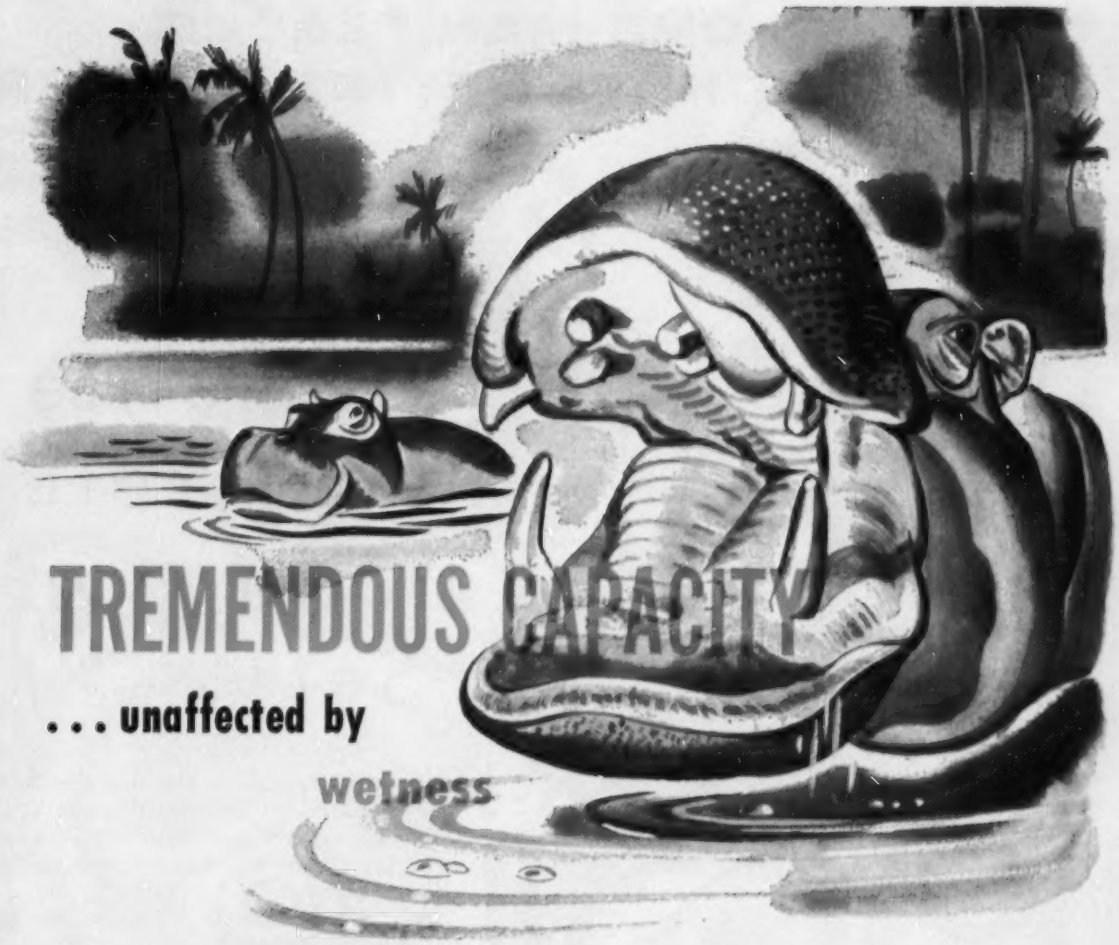
Gar Wood Tractor Equipment


Gar Wood Winches

Gar Wood-Buckeye Finegraders

Gar Wood-Buckeye Ditchers


Gar Wood Excavators



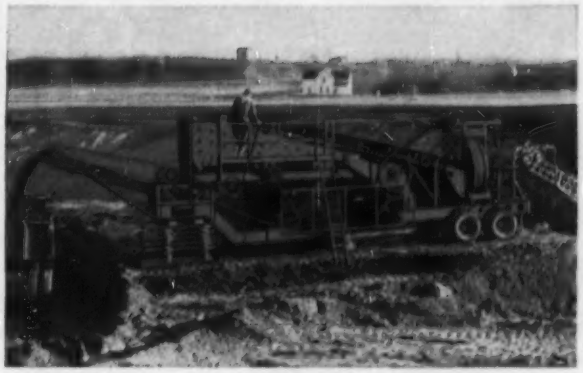

Big and adaptable, the hippo is a master in water. He can float like a log . . . submerge for 30 minutes . . . run across the bottom of a lake at eight miles an hour. On land, he runs as fast as a man . . . gallops at considerable speed . . . forages more than 25 miles a day to satisfy his huge appetite.

Universal built the 880 SENIOR "R" GRAVELMASTER like Nature built the hippo — for sustained performance under any conditions.

Wet, sticky material won't stop production when you're operating an 880 Senior "R". A 10" x 36" jaw teamed with a 30" x 26" roll crusher and a 4' x 12' inclined gyrating screen assures tremendous capacity. It takes an *inclined* gyrating screen to handle water-soaked pit-run material smoothly and efficiently.

Big and adaptable, the 880 Senior "R' can range like a hippo over wide territory. Travel it cross-country and see! The hippo-like quality of tremendous capacity unaffected by wetness adds to your profit when you own an 880 Senior "R".

Compare the 880 Senior "R" with competitive plants and you'll find a lot of other hippo-like features. Everything bigger — but the price!



*Write today for free bulletin*

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

**UNIVERSAL ENGINEERING CORPORATION**
**327-8th St., N.W., Cedar Rapids, Iowa**
A Subsidiary of Pettibone Mullikea Corporation, 4700 W. Division St., Chicago 51, Illinois

# ONE MAN PLACES CONCRETE BETTER, FASTER

with

# NEW Homelite Concrete Vibrator Set (HIGH-CYCLE ELECTRIC)

One simple connection and you're ready to pour with the new Homelite Concrete Vibrator Set. It reduces hand labor, eliminates scaffolding and speeds placement of even the lowest slump concrete.

The high-cycle motor built into the vibrator head makes the Homelite extremely powerful and easy to use. The vibrator head has one-foot handling hose, with polarized, screw-type waterproof connection permanently installed. Any number of 7′ or 10′ lengths of pre-loaded polarized handling hose can be attached *in seconds.*

The high-cycle motor is protected against overheating — even if it runs out of the concrete — and the hi-cycle design eliminates brushes and commutator.

The generator will run two vibrators simultaneously, doubling the placement speed. Heavy-duty cable, available in varying lengths, lets you place the generator in any convenient spot. Only the vibrator is in contact with the concrete and no special scaffolding or cradling is ever needed.

Ask your nearest Homelite office for a free demonstration, or write for Bulletin L-816.

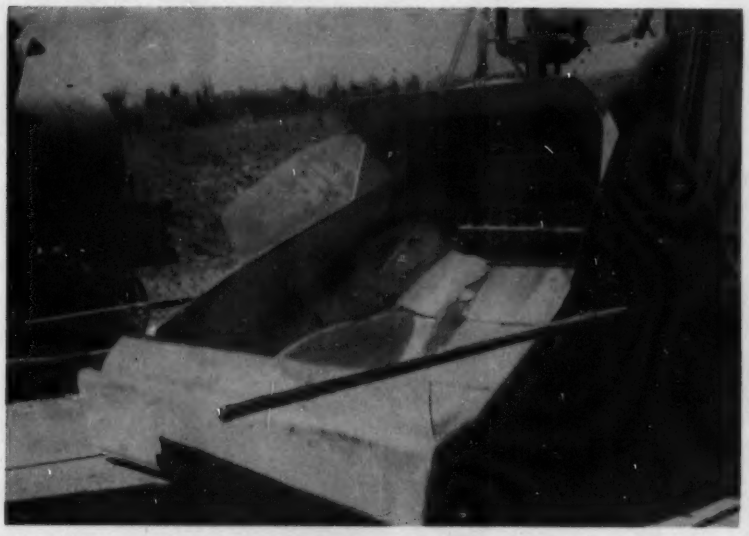
Homelite vibrator runs at 10,000 vpm, best speed for vibrating concrete. Motor holds speed constant, even under full load. Speed never fades.

**HOMELITE**

A DIVISION OF TEXTRON AMERICAN, INC.

1003 RIVERDALE AVENUE
PORT CHESTER, N. Y., U. S. A.

*Manufacturers of Carryable Pumps, Generators, and Chain Saws*



MIXER SKIP is equipped with a grid to prevent pieces of wood or cloth etc. from getting into the mixer. Dump trucks back against piece welded across the mouth of the skip.

welded stops. When the truck body is raised, the gate swings about the top rod to discharge the batch.

Some specifications require that cement be hauled in a separate compartment so that it is not in contact with the aggregates. These compartments often form the bulkheads separating the batches. A hinged door across the lower portion is held shut by the aggregates, and opens after they slide out.

When the cement is in a separate compartment, batches can be held in the truck indefinitely in case paving operations are interrupted. This cannot be done if the cement is in contact with aggregates that contain moisture. Some specifications limit the time within which the batch must be used, and others require additional cement if the batch is held over a specified time. For example, Illinois requires that batches be used within two hours, and Minnesota requires 10% additional cement after two hours, 20% after four hours, and prohibits the use of any batch after six hours.

Batch hauling is more severe on trucks than normal hauling. Much of the mileage traveled is over earth or loose granular material, so dust is a major factor in engine and running gear wear. Frequent rapid reversals of direction for dumping batches at the mixer skip places unusual strains on transmissions and drive axles. Proper attention to both routine and preventive maintenance is essential to reduce downtime of trucks. Breakdowns of loaded trucks usually will result in the loss of an entire load. It should be remembered that each batch for a 34 E paver contains approximately 7½ sacks of cement and over two tons of aggregate, the value of which should be figured in the cost of breakdowns.

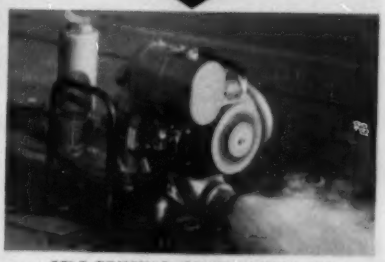
The number of trucks required to service a paving project depends on the number of batches per truck, the length and average speed of haul, and the time required to turn around at the batch plant and at the mixer. To estimate the number of trucks needed, divide the total time required for a truck to make a round trip by the time interval between trucks necessary for continuous operation of the mixer. To this number, add at least one truck to provide a margin of safety for unexpected delays. This has been expressed mathematically as:

$$N = \frac{60}{Kt} \times \left[\frac{60L}{S} + T\right] + 1$$

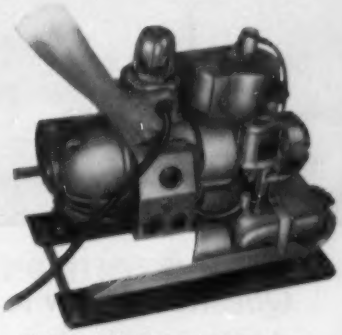
where N = number of trucks required
K = number of batches per truck
t = cycle for one batch in seconds
L = round trip haul in miles
S = average round trip speed in miles per hour
T = average time in minutes required at batch plant and paver, plus reasonable allowance for stops and delays.

*(Continud on page 132)*

**CHOOSE**
from a full line of
**HOMELITE**
Carryable
Construction
Equipment



**SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS**
Sizes: 1½" to 3" — capacities to 15,000 g.p.h. for dewatering and water supply.



**ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS**
Complete range of sizes and voltages up to 5,000 watts.

**LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS**
Complete line of saws with clearing and brushcutter attachments for every woodcutting job.

**HOMELITE**
A DIVISION OF TEXTRON AMERICAN, INC.
PORT CHESTER, N. Y.

The feet* here are piers used to support Harry Street Bridge, Wichita Kansas. Inland Construction Co., Contr.

*Question:* How to cross a river without getting your *feet** wet

*Answer:* Use a **STANG WELLPOINT SYSTEM**

*Reason:* **ENGINEERING – STANG** provides *on-the-spot* Engineering analysis, Layout Drawings and Field Service all in a tight, efficient "Engineering Package" that handles the details.

**AVAILABILITY – STANG** maintains fully staffed and equipped depots to service *any point* in the *country* with *any equipment needed* on a moment's notice.

**ECONOMY** through **EXPERIENCE – STANG'S** many years of experience on all types of dewatering projects assures the most *practical, economical,* and *time-saving solution* to any water problem anywhere—any time!

**NOW** – If you have a water situation, call **STANG.** You will receive our analysis and recommendations at *no obligation.* Write for Bulletin 100B.

*Putting water in its place*

STANG ...anyplace!

# JOHN W. STANG CORPORATION

**Engineers and Manufacturers of Unwatering Equipment, Wellpoint and Pumping Systems**
**Unwatering Planning—Equipment—Service**

| BELL, CALIFORNIA | OMAHA, NEBRASKA | TACOMA, WASHINGTON | TULSA, OKLAHOMA |
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| Telephone: Logan 5-7421 | Telephone: Walnut 7796 | Telephone: Broadway 4362 | Telephone: 7-8929 |

561

**OWNER AND OPERATOR AGREE:**

# Allis-Chalmers HD-16C torque converter tractor works longer, works faster, produces more

Dozing and pulling a scraper in rock-like shale, the HD-16C owned by Murray Construction Co., Waverly, Ohio, is relocating route 73, northwest of Peebles. On one stretch of road, fill being hauled 1200 ft by the 150-hp crawler and a 15-yd scraper will raise highway grade where it crosses a valley.

## More Yardage per Dollar

Co-owner Robert Murray has this to say about the new HD-16. "The tractor is a speedy worker and the torque converter is one of the reasons. We also find we haul more yardage for each dollar spent. And the time saved in not greasing track rollers daily should increase our profits."

Operator Kenneth Austin added this: "Our former tractor would stall loading rock like this, but the '16' goes right through. The torque converter saves clutching and makes it a lot easier for me. At the end of a day's work I'm not nearly as tired.

## Saves Half Hour Greasing Time Daily

"I get more production because I put in an extra half hour a day hauling and dozing instead of greasing track rollers. I can haul and dump three 15-yd loads in that time and that amounts to 225 yd of extra pay load every week."

★ ★ ★

An HD-16 gives you more power for bigger jobs . . . plus more effective use of power, with a brand new Allis-Chalmers diesel engine and your choice of two great drives — the job-proved torque converter or the easy-shift standard transmission. But that's not all — you get many more advanced basic design features such as all-steel, box-A main frame and one-piece steering clutch and final drive case . . . unit construction . . . and timesaving, simplified lubrication and service designed with better maintenance in mind.

*All in all, an Allis-Chalmers HD-16 brings you a top combination of performance and long life with mounted or drawn equipment . . . a higher rate of production, more working time, lower job costs.*

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

**Talk to your Construction Machinery Dealer today**

**ALLIS-CHALMERS**

*Now a new TDA® lightweight tandem that features...*

# UNEQUALED PARTS INTERCHANGE-ABILITY

# Uses many standard parts for faster service ...new lightweight design gives 7500 extra ton-miles of payload a year*

**Longer service, simpler maintenance!** Most wearing parts used in this new tandem are identical to parts in widely used Timken-Detroit® standard single axles. This use of standard gears, pinions, differentials, bearings and brakes means more time on the road for operators . . . reduces parts inventories . . . and speeds service.

**7500 extra ton-miles** of payload a year! This new TDA tandem is over two hundred pounds lighter than any other unit of the same capacity. During an average 75,000 mile year, an operator can save 7500 deadweight ton-miles. This deadweight can be replaced with vital payload that adds up to important extra profit.

Available with a choice of either Timken-Detroit Axle connecting groups, or brackets to accept other approved chassis hook-up parts . . . plus all these additional advantages with the Timken® lightweight tandem:

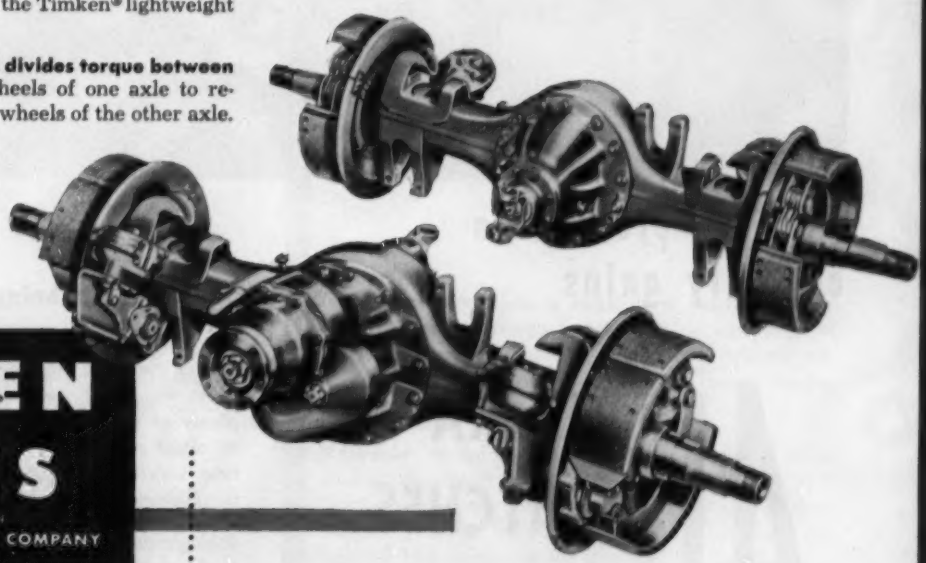
**TDA Inter-Axle Differential divides torque between axles**—and yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work—driving parts and tires last longer!

**Driver-Controlled Lockout.** With TDA inter-axle differential, the driver can obtain the advantage of straight-through drive under slick or icy conditions by locking out the differential at *any* driving speed.

**Big, dependable hypoid gears** rotate in conventional direction, for maximum gear and bearing life.

This new highway tandem insures new payload profits, faster, easier service and operating economies for truck operators everywhere. For complete information contact your vehicle dealer or branch.

***based on 75,000 highway miles a year.**



**TIMKEN Detroit AXLES**

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

Accepted T A Standard
TRADE MARK REGISTERED

***WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS***

**Plants at:**
**Detroit, Michigan • Oshkosh, Wisconsin**
**Utica, New York • Ashtabula, Kenton and Newark, Ohio**
**New Castle, Pennsylvania**

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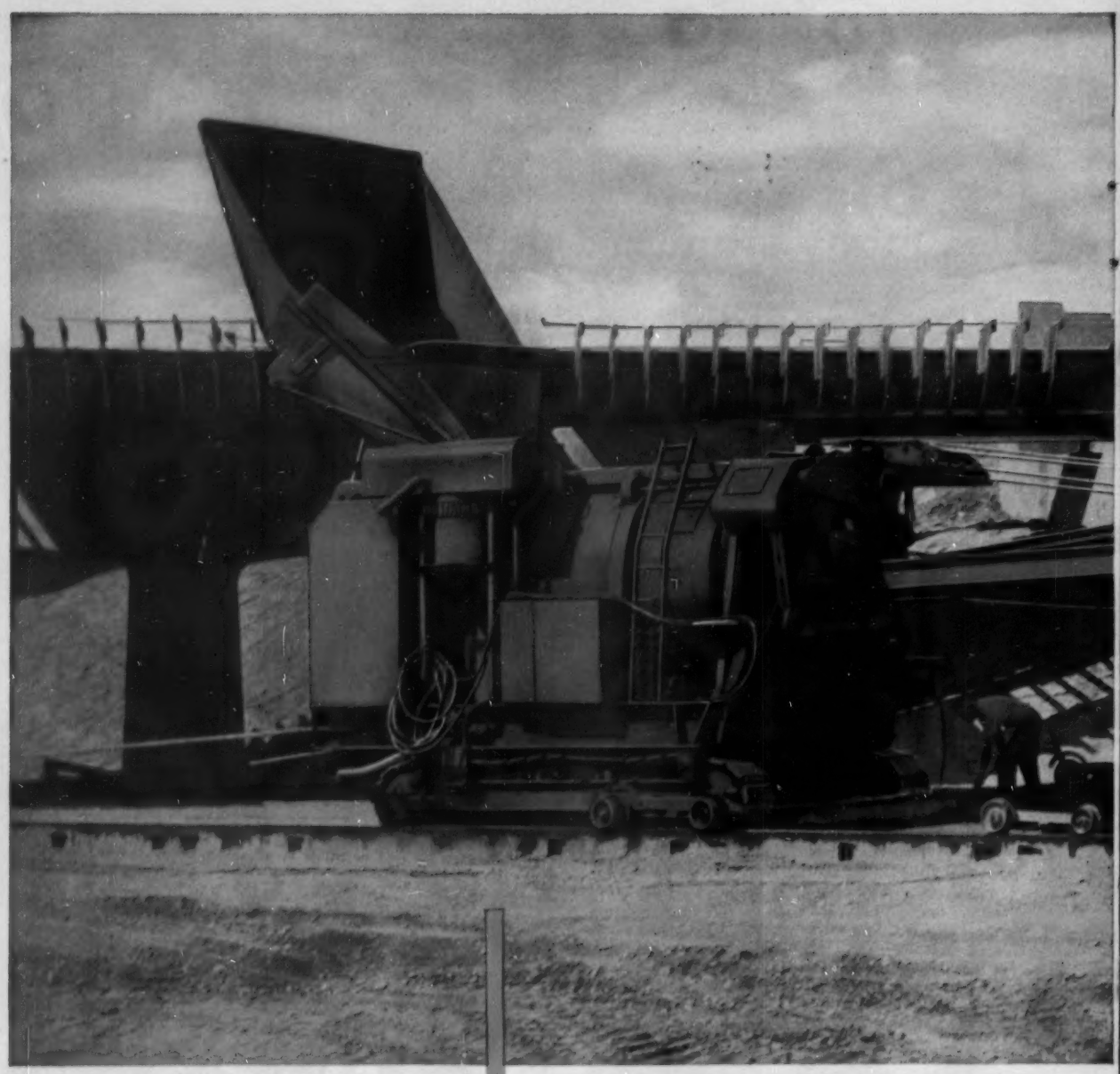


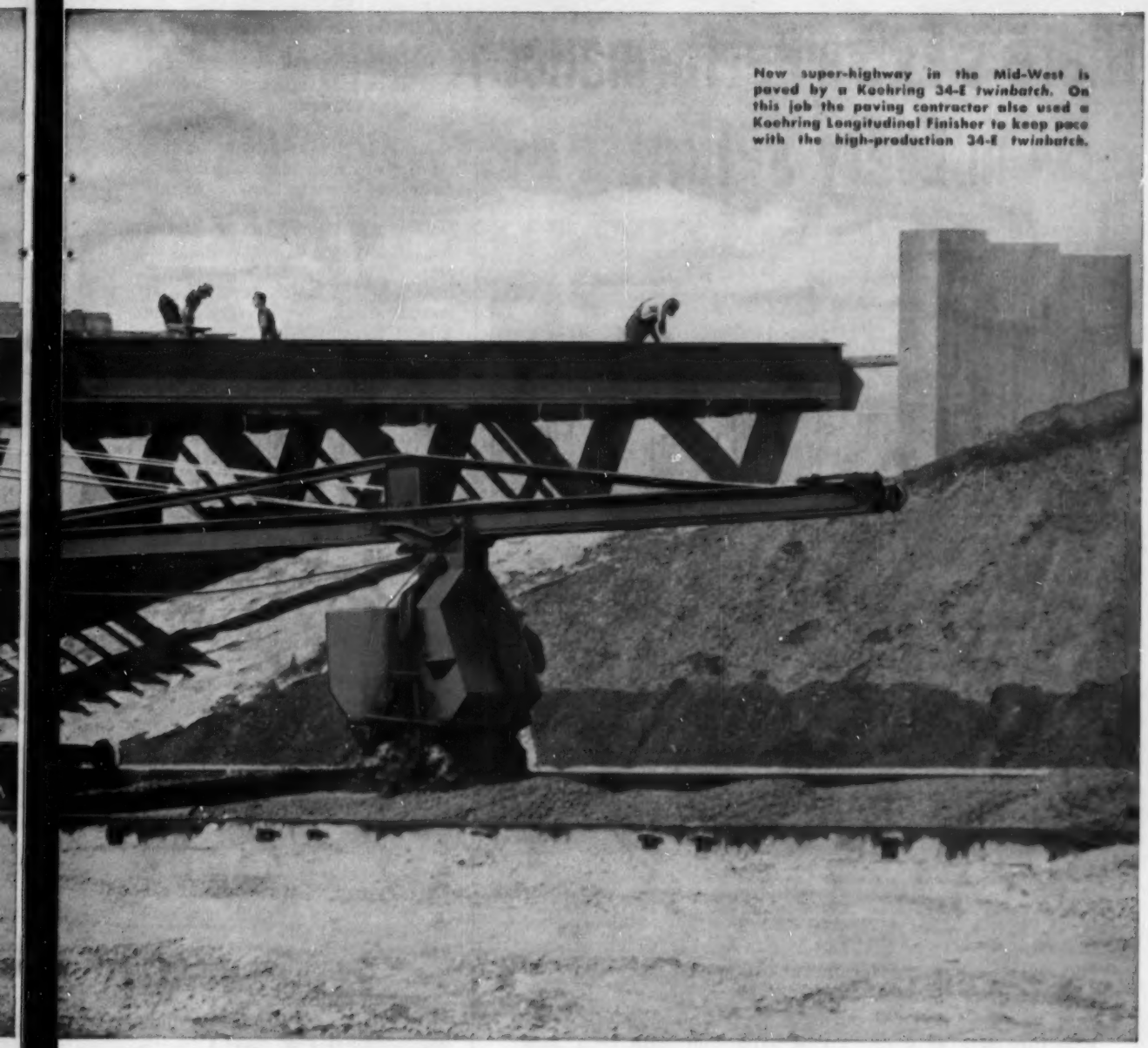
## Reserve production capacity gains

# 40 EXTRA BATCHES A DAY

**Koehring 34-E *twinbatch*® paver**

hits a top output of 86.7 batches an hour, on 60-second mixing cycle. It maintains high average batching speed because — with *twinbatch* Autocycle mixing — there's plenty of *reserve* production capacity when you need it to offset normal job delays. This lets you pick up lost time which cannot be made up with limited-production single-drum pavers. For example:

A single-drum paver theoretically mixes up to 50 batches an hour, but usually averages only about 45 batches due to normal production delays. Under identical job conditions — and with the same set-up of auxiliary equipment — Koehring 34-E *twinbatch* easily averages 50 batches an hour, 8 hours a day. You gain 5 extra batches an hour



New super-highway in the Mid-West is paved by a Koehring 34-E *twinbatch*. On this job the paving contractor also used a Koehring Longitudinal Finisher to keep pace with the high-production 34-E *twinbatch*.

over the single-drum paver — 40 extra batches a day. Yet, it requires only about 3 extra batches a day to offset the slight additional cost of a 34-E *twinbatch* paver. That leaves a net gain of 37 extra batches per day to help maintain schedules, complete more jobs per season, and earn more profits per job.

## No expense for extra equipment

You get this extra paver production with no additional investment in auxiliary equipment. By maintaining 50 batches an hour, the Koehring 34-E *twinbatch* keeps your present batch plant, hauling and finishing equipment working at maximum efficiency. What's more, this increase over single-drum paver production requires no extra paver operating expense, service or maintenance. The 34-E *twinbatch* is as simple as a single-drum machine. Basic units are the same, except for the double compartment drum — and, the Koehring 34-E is easier to operate because, with *twinbatch* Autocycle control, every mixing operation is automatic, accurate and fast.

You'll be miles ahead on your highway, airport and other big-production paving contracts with a Koehring 34-E *twinbatch* paver. Better see your Koehring distributor about it today, or write for bulletin. Also look into the mobile, rubber-tired 16-E *twinbatch* for smaller jobs.

**KOEHRING COMPANY**

Subsidiaries: JOHNSON
PARSONS • KWIK-MIX

Milwaukee 16,
Wisconsin

K-5-9

# There's Extra Performance in Every SPIRAL

The familiar SPIRAL that distinguishes Naylor from all other pipe in construction service is not just an identifying feature. It tells you that the pipe is light in weight, therefore easier and more economical to handle and install. It's your assurance that the pipe is extra strong and extra safe because Naylor's exclusive lockseamed, spiralwelded structure acts as a continuous expansion joint to absorb shock loads, stresses and strains. And it's evidence of the greater collapse strength that permits operation under either vacuum or pressure.

Specify Naylor for high or low pressure air and water lines, push-pull ventilation, materials handling and for other lines — to get this extra performance.

**Write for Bulletin No. 507.**

NAYLOR PIPE

**NAYLOR PIPE COMPANY**
**1288 East 92nd Street**
**Chicago 19, Illinois**

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York


**PAVING...Continued from page 125**

Usually pavers and batch trucks operate outside the forms. In some cases, this is required by the specifications; in others, it is adopted voluntarily by contractors. This type of operation does not disturb completed grade and permits earlier resumption after rains. Dowels and tiebars can be placed well in advance of concreting, and ample time is available for proper installation. A fairly level area at least 10 ft wide is necessary on one side of the forms for these operations. The slope to the ditch or backslope must be flat enough to permit empty trucks to turn out to pass loaded trucks waiting to discharge their batches at the mixer.

When the paver and batch trucks operate between the forms, a subgrade planer behind the mixer must correct any ruts they leave. In order for batch trucks to reach the mixer without backing the entire distance for which forms have been placed, either a turntable must be provided and moved at frequent intervals or a gap must be left in the forms and filled just before paving. Either method involves additional expense.

When the pavement is more than one construction lane wide, the paver is somethimes operated on the completed slab. This should not be permitted if construction schedules can be so arranged. In any case, no paver should be permitted on a slab until it has obtained sufficient strength to withstand the heavy loads.

## Water Supply

An adequate water supply is essential for satisfactory paving. Although water is necessary to mixing operations, the curing of the slab, when water curing is specified, has first call on the available supply. The supply should be sufficient to permit paving, curing, and compaction simultaneously.

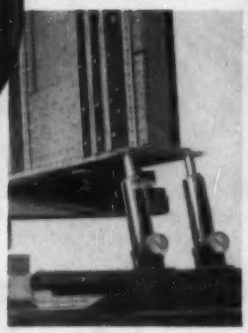
The use of pipelines to supply water for paving mixers was common practice a few years ago, but it has been found more economical to haul water by truck for compaction, mixing, and, where specified, for curing. Water from public water supplies is suitable for use in concrete. Water from small wayside streams should be tested before use. Water is not suitable unless the strength of mortar cubes made with it have at least 90% the strength of cubes made with distilled water.

*(Continued on page 137)*

# every day more ways discovered to SPEED CONSTRUCTION JOBS with BLACKHAWK® Hydraulic Tools

HERE's a source for spectacular short cuts that help you meet deadlines and solve tough problems in construction and maintenance. Blackhawk builds 103 hydraulic power tools — *the only complete line* — and they're replacing dangerous, damaging, time-consuming methods on job after job. Included are standard jacks 1½ through 100 tons plus the amazing Blackhawk "Porto-Power" remote control jacks that push, pull, clamp, spread, press and bend. Order from your equipment distributor. Write for free Hydraulic Tool Catalog H-201 — it's full of *ideas* you can use NOW!

*Pictured at right — EA-27 Jack — 27" high, lifts up to 49½". 20 ton capacity; $115.00.*



**"High Lifts" weigh a bridge.** Equipped with gauges, two Blackhawk "High Lift" jacks check the weight of a giant steel bridge section. This model, with full 22½" hydraulic lift, performs countless other tasks that keep construction jobs everywhere moving full speed ahead!

**Lift over any span or any angle** — Extensions and attachments thread onto the "Porto-Power" jack for fast, easy work. More efficient, and eliminates dangerous blocking as in this photo of a building being raised. Operator stands safely at distance and can sight his job.

**Big repairs right in the field.** Blackhawk "Porto-Power" using a 50-ton ram straightens a clam shell bucket cutting lip without removing bucket. Another example of maintenance in minutes with "Porto-Power" instead of delaying detours to the shop that cost *hours* in down time!

**See the equipment distributor who sells the world's most *complete* line of hydraulic tools**

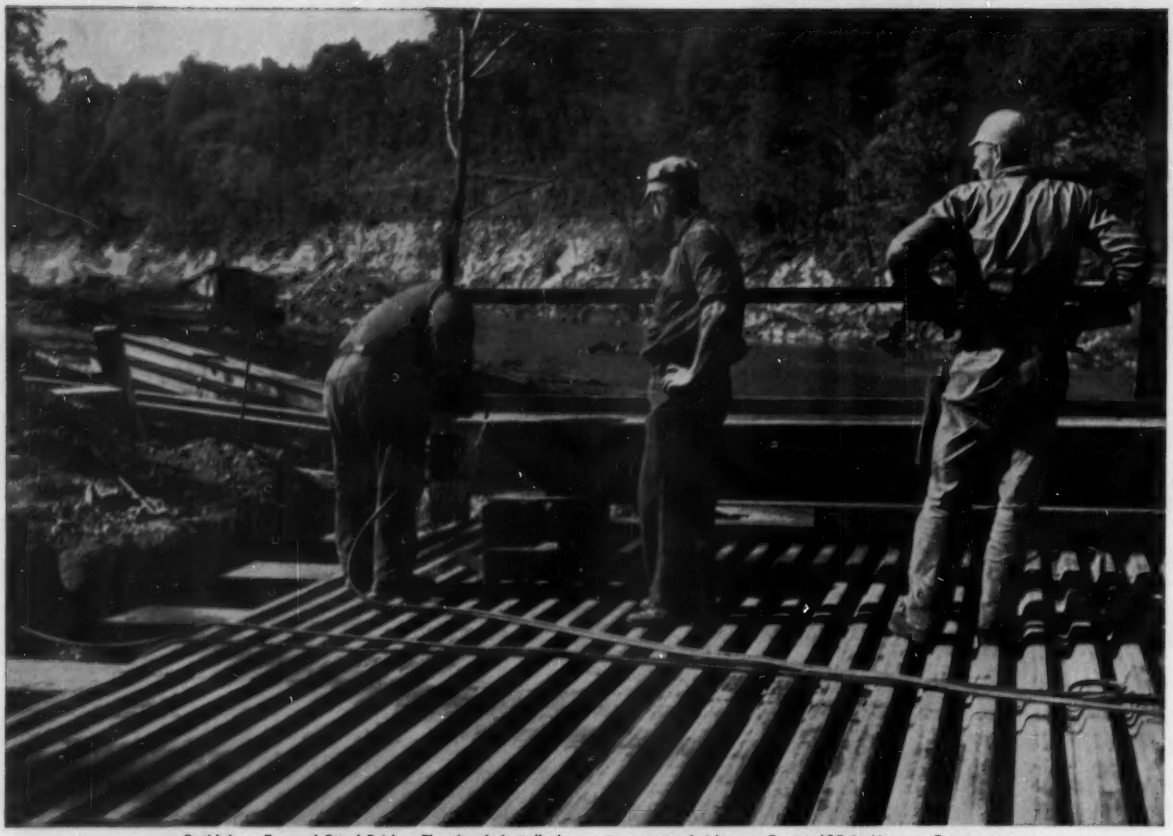
"Porto-Power" Remote control jacks
Hydraulic pipe-benders and knockout punches
Power driven hydraulic pumps
Gauge-equipped jacks
Hydraulic jacks thru 100 tons

*World's largest manufacturer of Hydraulic Tools*

**BLACKHAWK®**

**BLACKHAWK MFG. CO., Dept. H-2336, Milwaukee 46, Wisconsin**

Price subject to change without notice



Bethlehem Formed Steel Bridge Flooring is installed on a temporary bridge on Route 402 in Monroe County.

# Temporary Bridges in Flood-Torn Monroe County, Pa., Built with Formed-Steel Decks

As a result of last summer's devastating floods, Monroe County, Pa., was left with over 40 highway bridges knocked out. At 25 locations in the county, temporary bridges had to be quickly put up in order to connect vital traffic routes.

These temporary bridges were built with a general design of H-piles, pile-capping, stringers, and bridge deck. And on many of the bridges, the deck used was Bethlehem's Formed Steel Bridge Flooring.

Temporary bridge in Stroudsburg, Pa., built with Formed Steel Flooring.

The advantages of using Formed Steel Bridge Flooring were many. First, it was quickly and easily installed. A simple A-frame derrick carried the plates from stockpile to bridge. Field welding secured both the flooring to stringers, and the adjacent plates together. After surfacing material was applied, the new bridges were smooth and rattle-proof, requiring little or no maintenance.

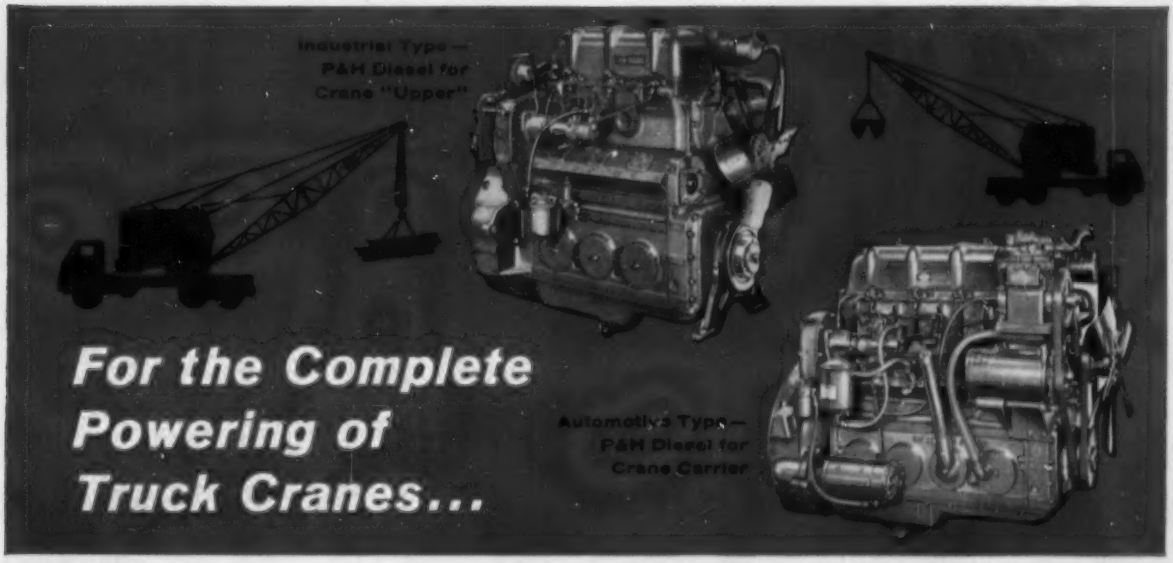
Even though the Monroe County bridges were built for temporary use, they are strong enough to meet local traffic load requirements. One reason for their strength is the formed steel decking, for Bethlehem Bridge Flooring meets all strength specifications of the American Association of State Highway Officials' standard specifications for highway bridges.

For complete information on bridge flooring, just phone or write the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL




# IT PAYS TO STANDARDIZE ON P&H DIESELS

In the *past* Diesels have never been welcomed for the *complete* powering of truck cranes. Slow starting—stalling while idling—insufficient acceleration have proved handicaps to their acceptance, especially for powering of the carrier.

Now these limitations to the use of Diesels for *complete* powering have been totally overcome through new P&H product developments. Highly responsive P&H Engines—Series C-18 accelerate and decelerate as fast—idle as well without fouling or clogging—start in normal temperatures as quickly as a gas engine.

When you standardize on 2-Cycle P&H Diesels for *complete* powering, you get the right Diesel power for the right job. An Automotive Type-P&H Engine in the crane carrier takes you wherever a truck can go—gets you between jobs fast. An Industrial Type-P&H Engine in the crane "upper" helps you handle any crane assignment with plenty of slow, sure, steady power for maximum control, safety and production.

For the first time you can burn fewer gallons of low-cost Diesel fuel in *both* truck crane engines. Use of 2 similar type P&H Engines also results in easier understanding and better maintenance of *both* engines by *one* man. Savings are substantial, too, on parts inventorying and repair costs. All wearing parts are interchangeable between P&H Engines.

If you want money making and money saving power, it will pay you to investigate the *complete* powering of your truck cranes with P&H Diesels.

**P&H Product Development Features In New Series C-18 P&H Diesels**

**For Quick Starts**—automatic retarding of the fuel injection until P&H Engine speeds reach 500 r.p.m.

**For Good Idling**—use of P&H developed injector tips with a single, large hole to prevent fouling or clogging.

**For Instant Response**—new, simplified P&H fuel system providing fast acceleration and deceleration.

**For Dependable Power**—new P&H Power Assembly, new cooling system, new dual porting of cylinders for better combustion—more power.

**For Less Down-Time**—simplicity of P&H Diesel design, interchangeability of all wearing parts and the P&H "Unitized" Power Assembly.

P&H Diesel Engines are available in 2, 3, 4, and 6 Cylinder Models for the complete powering of truck cranes from 15 to 35 tons in size.

*For Modern Engineering, Look to*

# HARNISCHFEGER

P&H DIESEL ENGINE DIVISION
Crystal Lake, Illinois

P&H Diesel Engine Division—Harnischfeger Corp. Crystal Lake, Illinois

Please send me additional information on P&H Diesel Engines for complete powering of truck cranes.

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

# Again in '55...

# MACK

# 1st* IN DIESEL TRUCK SALES

## and by the biggest margin ever!

*based on official A.M.A. factory sales figures. Nearest make attained 17.16% of the market.

## 42.06% of all diesel trucks sold in 1955 were MACKS!

Operators everywhere, in all kinds of hauling operations, have again made Mack their No. 1 favorite among *all* diesel trucks. And their margin of preference is the biggest so far! Regardless of competitive claims, Mack owners have learned from millions of miles of heavy-duty operation how truly outstanding are Mack trucks powered by the famous Mack Thermodyne Diesel engine. They're *first* in earning power . . . because they're *first* in fuel economy, *first* in low-cost maintenance, and *first* in rugged long life. See your Mack branch or distributor for the full story. Mack Trucks, Empire State Building, New York 1, New York.

**MACK**
***first name for***
**TRUCKS**

3961-A

**PAVING... Continued from page 132**

CHECK MIXER before paving begins. Water system should be tested to make sure it delivers the proper amount of water to each batch and does not have leaky valves.

When water is obtained from roadside streams or small ponds, the end of the suction line should be screened, and the water should be taken from a sump so that mud and debris will not be pumped into the tank. Placing the suction line in a sunken metal drum with numerous holes punched in the sides is a good method.

### Paving Mixers

All paving mixers conform to standards of the Mixer Manufacturers' Bureau of the Associated General Contractors of America. The size is designated by a number which is the nominal capacity of the mixer. Three sizes are manufactured—16, 27, and 34 cu ft. nominal capacity. Mixers are guaranteed to properly mix a batch 10% greater than nominal capacity when operating on a maximum grade of 6%, and the use of this 10% additional capacity is almost universally permitted. All paving mixers are provided with a boom and a bucket for spreading the concrete evenly over the subgrade.

The operation of paving mixers is as nearly automatic as practical. Controls can be set so that movement of a lever will start the automatic cycle of raising the skip, closing and locking the discharge chute, turning on the water, and starting the batch meter. The skip is then lowered by hand, and after the specified time has elapsed, the discharge gate is opened, and the cycle repeated.

Before any project is started, the mixer should be carefully checked to insure that it complies with specification requirements. Most state highway specifications are quite explicit. The most important of these concern mixer blade wear, batch meters and timers, water and air-entraining agent valves, and measuring devices. These items should be checked at the same time the engine and other operating parts are serviced. Careful attention should be given to valves controlling the amount of water added to each batch. Any leakage of these valves results in variations in consistency of the concrete which make it difficult or impossible to construct an even riding surface.

Timers and discharge gate locks should be kept in good operating condition. Many specifications require that if these items are not operating, a clock with second hands be provided and the mixing time increased until repairs are made. This results in lowered production with accompanying increases in unit costs.

Control of the amount of water added to each batch at the mixer

*(Continued on page 142)*

# MEN OF STEEL

The reconstruction of the swing-span over the Harlem River between the boroughs of Manhattan and the Bronx was executed by TERRY.

The story behind the brilliant construction achievements of the great TERRY organization is basically the story of men. Men of proven ability. Men of vast experience. Above all, *dedicated men* who have made it their business to master every facet of engineering, designing, fabricating and erecting. In every sense of the word, *men of steel.*

*work... not words... tells the story of*

# TERRY

*Steel Contractors, Inc.*

**Sales & Executive Offices: THE TERRY BUILDING**
**31 East 27th Street, New York 16, N. Y. • MUrray Hill 9-0011**

Low, wide bowl of Fullpak Scraper with 9½' blade gives live, boiling action that quickly fills back corners, heaps high fast for big payloads.

Fullpak Scraper is ruggedly built, with double-steel bottom reinforced by welded steel filler-channels. Box-beam construction reduces dead-weight, increases strength. Sturdy push-block (43" x 16") pushing directly to blade through scraper-bottom, maintains contact with pusher over rough or bumpy ground.

# New Model C Fullpak

2 Lower yoke—operator sees clearly the cutting edge, load, and pusher—can better synchronize power and direction for load, and spread more accurate grade.

1 New lower, wider bowl — packs in load to back corners with live, boiling action, heaps quickly for big, low-void pay-load.

3 High apron-lift (6'1") means fast, easy unloading of chunky materials and rocks.

4 Positive forward-ejection of load, wipes bowl clean of all materials, including mud and sticky clay.

5 Low push-block matches height of crawler-tractor push-plates, applies power in direct line with cutting-edge to utilize full horsepower and tractive effort.

6 Quick-release clutch on scraper, with fast electric hoist, permit rapid "pumping" action of bowl, for speedy loading of loose materials.

7 Powerful 208 hp C Tournapull prime-mover—with constant-mesh, or sliding-gear transmission — has speeds to 30 mph.

8 Exclusive, power-transfer differential matches pull to traction, makes Tournapull best "mudder" in the earthmover field.

Tournapull, Roster—Trademark Reg. U.S. Pat. Off., Fullpak—Trademark

Tractors

Rear-Dumps

Graders

TraveLoaders

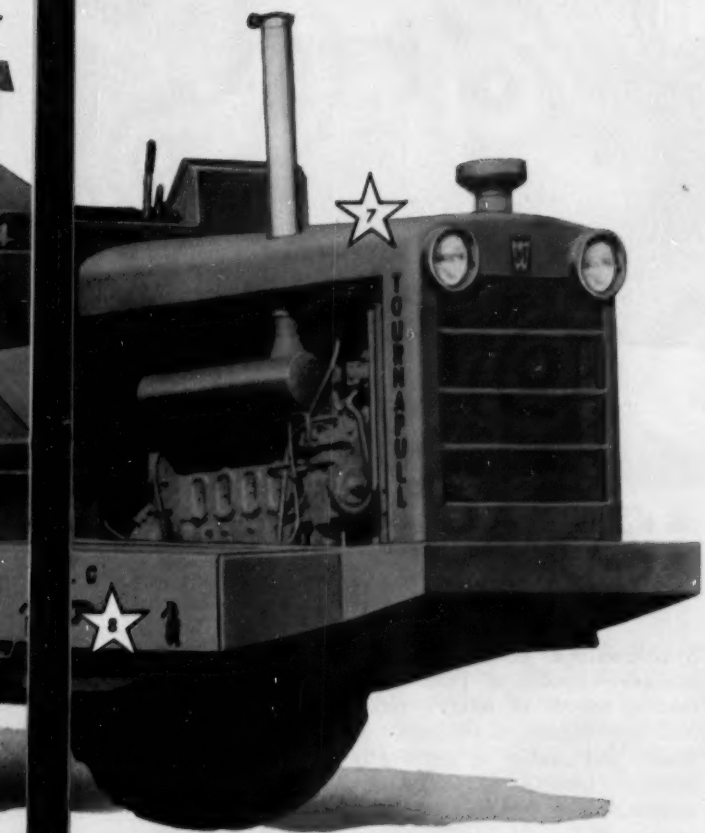
Bottom-Dumps, Cranes, Flat-Beds, Elegraders, Rollers, Snow Plows, Logging Arches and Skidders, Scrapers and PCU's, Rooters, Root Rakes, Wire Rope

Curved deflector-plate on top of tailgate, together with curved apron, give best boiling action for fast heap, eliminate spill, help fill corners. Wheels inside cutting edge make precision work possible next to banks and on slopes.

Big 208 hp Model C Tournapull prime-mover with Fullpak Scraper makes 180° turn in 31' 2", rides on 4 big 26.5 x 25, 26-ply rating, low-pressure tires, travels up to 30 mph over highways and cross-country.

# Scraper *18 cu. yards heaped*

## Loads faster... boils better...




9 Power-steer on geared king-pin permits 90° turn, swings prime-mover side-to-side in soft going, placing drive-wheels on firm footing to "walk" out of mire.

10 Push-button control makes handling easy. Brushless, all-weather electric motors at point-of-action give instant steer-and-scraper control, minimize cable needs.

You've never seen a scraper that loads as *easy* and heaps as *fast* as this new LeTourneau-Westinghouse Model C Fullpak Scraper.

New Fullpak low, wide bowl, loads up to 18 cubic yards heaped capacity with minimum of loading resistance. Low push-block matches height of tractor push-plates. Direct line application of power from pusher to blade, makes easier, faster loading.

The "low and wide" design of this new Fullpak Scraper helps get more "boiling" action, makes it easy to fill back corners as well as apron, packs in a big load *fast*. Wheels are inside cutting edge, for precision finish work next to banks and on slopes. Positive, forward ejection forces out sticky as well as dry material ... wipes bowl clean each load. High apron lift (6'1") permits all material to be quickly and cleanly unloaded. Fullpak Scraper spreads in accurate lifts to meet any construction requirement.

Powerful, improved 208 hp Model C Tournapull prime-mover has the famous power-transfer differential that keeps pulling-traction on both drive wheels at all times ... also geared king-pin power steer that can turn 90° and "walk" Tournapull out of mud and loose sand that stalls ordinary prime-movers. You have top speeds to 30 mph, with choice of sliding-gear or constant-mesh transmission.

**This new 18-yard, faster-loading Fullpak Scraper means more pay yards for you**

Before you buy your next scraper, get full information on this new Fullpak 18-yard C Tournapull. Contact your local Distributor for complete details.

P-1024-G

**LeTourneau-WESTINGHOUSE Company**

Peoria, Illinois

*A Subsidiary of Westinghouse Air Brake Company*

# Now... world's MOST POWERFUL and The Twin-C

## with 416 HP and 4-wheel drive

## ...to give you bigger loads in shorter loading time

One operator, and this powerful "Twin-C", pushes your biggest production scrapers for capacity yardage ... in less time than it takes 2 crawler-pushers with 2 operators. Rubber-tired speed, and articulated steer, give quick manœuverability for direct-line push... save seconds in picking up the next load. "Twin-C's" 416 hp push saves extra seconds in loading ... piles a bigger heap on a better packed load.

***Synchronized power matches speeds of earthmovers*** — Speeds of Twin-C Pusher are matched to loading speeds of today's rubber-tired earthmovers. You take maximum advantage of combined power of loader and pusher to get big pay loads *fast*. Low-pressure, trouble-free torque-converters teamed with constant-mesh transmission in both front and rear engines of the "Twin-C" reduce costly "lug downs" and gear changes necessary in many pushers.

***More usable power with rubber pushing rubber*** — Big 29.5 x 29 tires with 22-ply rating give "Twin-C" 25" wide ground-gripping traction to take advantage of its 80,000 lbs. weight. Tires are hydro-flated and have wheel weights. With both pushing tractor and

**LeTourneau-Westinghouse Tournapull Scraper Line ...**

B TOURNAPULL 25 cu. yds., heaped

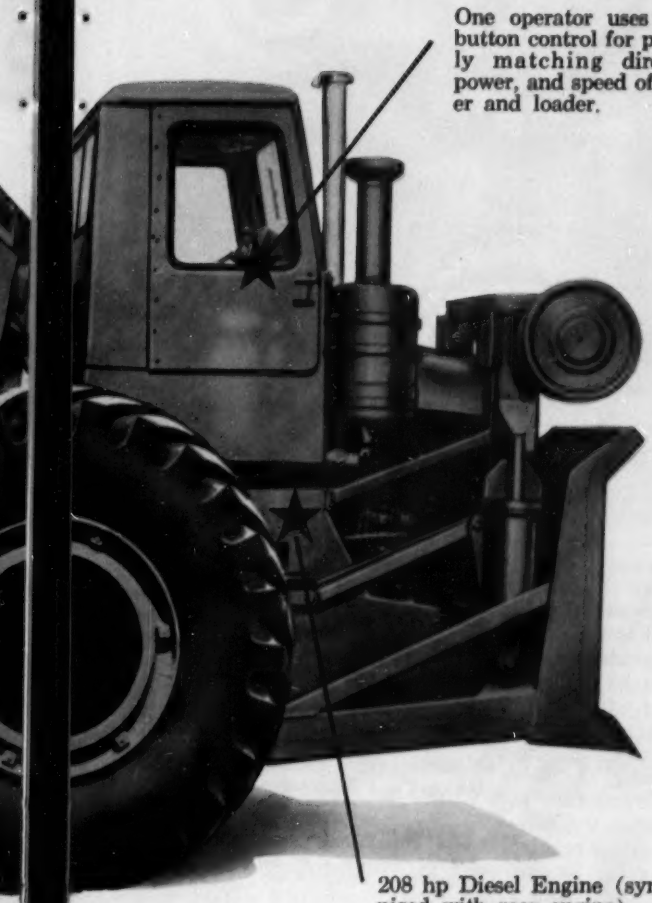
C TOURNAPULL 18 cu. yds., heaped

D TOURNAPULL 7½ cu. yds., heaped

Optional LeTourneau-Westinghouse equipment for use with Tournapull Prime-Movers: Rear-Dumps, Bottom-Dumps, Flat-Beds, Logging Arches and Skidders, Lift-and-Carry Cranes, Snow Plows, Bulldozers.

# FASTEST push tractor...

# Pusher



One operator uses push-button control for perfectly matching direction, power, and speed of pusher and loader.

208 hp Diesel Engine (synchronized with rear engine)

Powerful 80,000 lb. Twin-C Pusher on big, wide-base tires push-loads scrapers faster in shorter distances...permits use of more scrapers in fleet...eliminates delays waiting-for-pusher.

Wet or dry...416 hp Twin-C Pusher has power and traction to lick any kind of scraper material. This Twin-C loaded 23-yd. scrapers fast in a wet fill to keep this job on schedule.

scraper unit on rubber, you have full floating traction ...tire treads follow tire treads...no loss of power required to flatten out rounded tire-tracks into flat track-tracks. With speed and power characteristics better matched...and matched rubber-tired traction ...you get greater usable horsepower and coordinated pushing force when you push rubber with rubber.

***High-speed for fast-positioning*** — Rubber-tired speeds up to *20 mph forward and fast reverse*, plus "articulated" steer, allow Twin-C Tractor to back-up fast, turn faster, position faster behind scrapers.

***Floating push-plate, electric-controlled*** — Big 49½" x 88" heavy, concave push-bowl is positioned by an electric motor to take full advantage of contact area provided by scraper push-block. Operator can "feel" the load to determine best position of push-bowl for direct-line push to pile dirt in scraper *fast*.

***Push-button electric-controls*** — Famous "instant" response electric-controls give you positive power-steer of pusher and power-positioning of push-plate. Electrical system is safe, trouble-free, weather-proof... same type controls used successfully on LeTourneau-Westinghouse scrapers for more than 8 years.

***Power-transfer differentials*** — Exclusive power-transfer differential matches pull to traction, automatically applies power to wheels on firmest footing, keeps big pay-loads rolling out in sand, mud, and loose materials. "Twin-C" decreases time lost because of bad weather and soft going...increases length of work season...with greater profit possibilities.

If your fleet includes production scrapers of any kind, you will want full information on this Twin-C Pusher. Ask your LeTourneau-Westinghouse Distributor for complete details.

Tournapull—Trademark Reg. U.S. Pat. Off., Twin-C—Trademark TW-1025-G

**LeTourneau-WESTINGHOUSE Company**

Peoria, Illinois

*A Subsidiary of Westinghouse Air Brake Company*

MONOLITHIC CONSTRUCTION

*Look at the results of "Concretor"*

**HYDRAULICALLY RAISED SLIPFORMS**

**RAISED IN 7 DAYS**

3 Concentric Walls 143 ft. High

Ft. Hood, Texas, 1954

**8 STORIES — 5 DAYS**
**including interior walls**
Memphis, Tenn., 1955

**Note compact jacking unit**
A method is only as good as the equipment. We invite your inquiries.

**"Concretor" Hydraulic Jacks**
and Slipform Equipment

**By B. M. HEEDE, INC.**
30-01 37th Ave., Long Island City 1, N.Y.
In San Francisco: 260 Kearny St.

**PAVING... Continued from page 137**

CONCRETE for widening the Garden State Parkway in New Jersey is mixed in 5 cu yd transit mixers in the proportioning plant yard and hauled to the job in Dumpcrete trucks.

is the responsibility of the engineer or inspector. Accurate records should be kept of the time, stationing, and batch number at which changes are made in the water added. The same procedure should be followed in regard to the addition of air-entraining admixtures. Frequent tests should be made of the air content of the freshly mixed concrete and adjustments made in the amount of admixture. Responsibility for maintaining an adequate supply of the admixture in the dispenser rests with the contractor. Most specifications require that the tank holding the air-entraining agent be provided with a glass gage indicating the level of the liquid.

Spreading of the concrete on the subgrade is under the direct control of the mixer operator, and his skill and judgment in depositing the proper amount greatly influences the ease with which finishing operations are carried out. The amount of concrete should be just sufficient to provide a slight excess to be carried ahead of the spreader or finishing machine. This will assist in securing uniform consolidation, which is essential if surface smoothness is to be kept within allowable tolerances.

Thorough cleaning of the mixer at the end of each day's operation by running through several operation cycles entirely with water is essential to efficient operation. Lack of proper cleaning results in building up deposits of hardened concrete in the drum with consequent loss of mixing efficiency.

### Truck Mixers, Agitators, and Dump Trucks

The standards for truck mixers and agitators of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association specify the approved sizes of these units. They set forth their capacities as mixers and as agitators. These are shown in the following table:

| Normal Rated Capacity as Mixer | Guaranteed Capacity as Mixer | Capacity as Agitator |
|---|---|---|
| 2½ cu yd | 3 cu yd | 3¾ cu yd |
| 3 " " | 3½ " " | 4¼ " " |
| 3½ " " | 4 " " | 5 " " |
| 4½ " " | 5 " " | 6¼ " " |
| 5½ " " | 6 " " | 7½ " " |
| 6½ " " | 7 " " | 9 " " |
| 7½ " " | 8 " " | 10¼ " " |

Until recent years, transportation of mixed concrete to the project was done in agitator type trucks. The capacity of various truck mixers, when operating as agitators, is shown in the third column of the foregoing table. The approximate weight of agitators and concrete can be determined by adding to the weight of the concrete (about 4,000 lb per cu yd) the weight of the agitator, which may be assumed at 1,000 lb per cu yd of capacity.

Many specifications limit the time allowed between mixing water with the cement and aggregates and depositing the concrete. ASTM specifications limit the time of haul in agitator trucks to 1½

*(Continued on page 144)*

# How tractor-on-rubber speeds highway improvement work *in Ethiopia*

Excess earth is dozed into valleys where it will later be used to fill around trees and culverts. Big 4-wheel air-brakes give operator confidence to work safely near steep banks.

Earthmovers around the world have found the versatile 19 mph Tournatractor a handy tool on a wide range of dirtmoving assignments. Typical jobs and problems encountered by contractors in Chile, Iraq, or Malaya are usually quite similar to dirtmoving "headaches" in Maine, Texas, or California. For example, here's how 5 Tournatractors, working under adverse conditions, speed work assignments for the Imperial Government of Ethiopia.

To improve their national highway system the Ethiopian Government works 5 high-speed Tournatractors on a busy 12 month-a-year schedule. These rubber-tired tractors operate in rainy highlands, arid deserts, in near-freezing temperatures, and often in equatorial heat. Material ranges from wet mud to abrasive sand and rock . . . yet Tournatractors have proved efficient under all conditions.

### Prevents landslides near Addis Ababa

The advantages of these versatile units are clearly illustrated by a recently-completed landscaping project near Addis Ababa. The job consisted of benching hills to keep landslides from blocking a modern all-weather asphalted highway which circles the mountains around the city.

Tournatractor strips heavy sod and levels subsoil to prepare athletic field for a police training school. Rolling action of big low-pressure tires help compact material.

Tournatractor worked at more than 8400 feet above sea level to doze a mixture of loam, decayed top vegetation, and dry, hard red clay. It dug out many deeply rooted stumps which dotted the area. It crossed pavement and traveled along the highway without damaging the bituminous surface. Its mobility, plus high rate of production, enabled the unit to complete the project well ahead of schedule. Government officials say this *one* rubber-tired Tournatractor did the work in *one-third* less time than could a combination of *two* crawler-tractors.

### Levels 2500 cu. yds. in 40 hours

Another of the Government's Tournatractors performed equally well when it stripped and leveled a new athletic field for the Ethiopian Police Training School near Addis Ababa. In five 8-hour days, this machine moved 2500 cubic yards of earth and sod. Total included all rough and final dozing; even some finish-grading.

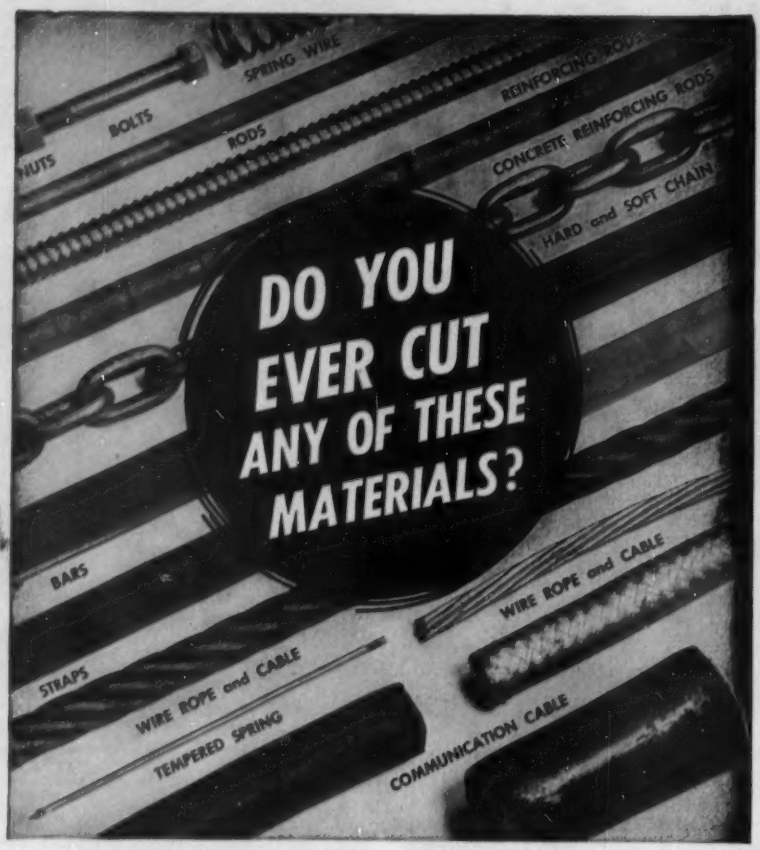
Meanwhile, the third Tournatractor stockpiled materials for highway surfacing. At the same time, the fourth and fifth Tournatractors, equipped with power control units, pulled 11-yard LeTourneau-Westinghouse Scrapers to build shoulders and drainage ditches along highways.

From time to time as needed, the 19 mph Tournatractors took time off from other assignments to pull LeTourneau-Westinghouse Rooters that ripped old bituminous road surfacing before retopping.

Tractor-on-rubber speeds can help cut costs and save time on your earthmoving, too. Ask your LeTourneau-Westinghouse Distributor to help you estimate savings possible on your operation.

Rooter, Tournatractor—Trademark Reg. U.S. Pat. Off. T-978-G-b

LeTourneau-Westinghouse Company
PEORIA, ILLINOIS
*A Subsidiary of Westinghouse Air Brake Company*

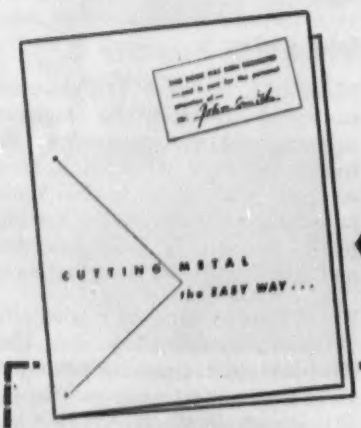



— with hand tools on the job or in the shop?

Porter hand power cutters cut up to and including

3/4" bolts — hard or soft
3/4" chain
5/8" rod
7/8" wire rope

as well as steel strapping, insulated cable, spring wire, etc.




**SEND** for this book which shows materials to be cut and cost comparisons between cutting methods. It may save you money.

**H. K. PORTER, INC.**
**Somerville 43, Mass.** Dept. C-3

Please send me my copy of "CUTTING METALS THE EASY WAY".

NAME _____

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CITY _____ STATE _____

MY DISTRIBUTOR IS _____

**PAVING... Continued from page 142**

hours unless a longer time is specifically authorized by the purchaser. ASTM specifications also recognize that in hot weather it may be advisable to specify a shorter time.

The increase in the use of air-entrained concrete with its tendency to resist segregation has led to the development of non-agitating dump bodies for the delivery of this type of concrete. These bodies are specially designed to discharge rapidly and cleanly the low slump concrete specified for pavement construction. Shorter elapsed time after the addition of the water or shorter length of haul is sometimes specified for concrete hauled in non-agitating dump trucks. ASTM specifications limit this time to 45 min. It should be noted that these specifications do not differentiate between air-entrained and non-air-entrained concrete.

These are some of the factors to be considered in equipping and laying out a paving project. Careful attention to specification requirements and to equipment and methods of operation—along with early discussions of these matters between engineers and contractors—will do much to insure that operations proceed without interruption.

### Test of Materials

Tests in conjunction with paving projects may be divided into three classes: first, those made of materials to check on their suitability for use and for compliance with specifications; second, those made of the concrete, either when freshly-mixed or after hardening; and third, tests for pavement thickness and surface irregularities.

Preliminary tests should be made of all aggregates before commitments are made as to their use. Other materials, including cement, steel for dowels, tie bars and distributed reinforcement, curing compounds, air-entraining agents, etc., require laboratory testing. Many of these materials are accompanied by copies of tests or statements that they will meet certain standard specifications.

Fine aggregate acceptability tests usually include gradation, determination of deleterious and organic material, and soundness. Standard tests for these requirements have been established by both the American Society of Testing Materials and the American Association of State Highway Officials. All of

*(Continued on page 148)*

On highway construction, road maintenance, ditching, terracing, finish grading, spreading road mix, land leveling, Adams 660 gives you the extra power, speed, and stamina to do all of these jobs *faster, better,* and at *lowest* cost.

# Here's Why

## you should check the ADAMS 660 against your present heavy-duty graders

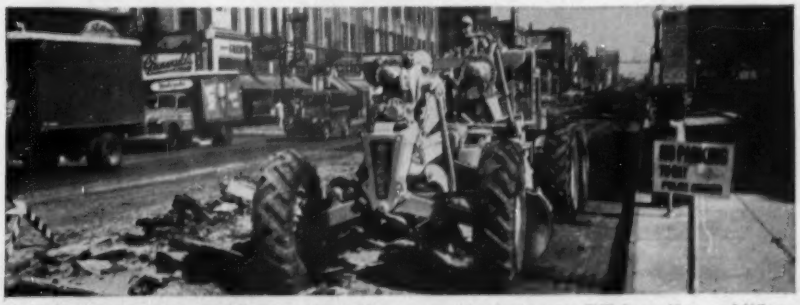
A lot has happened to the BIG grader field in the last year or two. For instance, if you have one of the 115 hp competitive graders that were "BIG" a few years ago, Adams 660 can now give you . . .

1. 30% more horsepower for deeper cuts, harder materials, faster cycles.
2. 29% more weight on drive wheels to apply more power, get more work done faster.
3. 35% higher travel speed to cut non-productive time between work assignments.
4. 117% higher reverse speed for more cycles per hour on shuttle grading.
5. 33% extra forward-speed-selection of power to match your load. With optional creeper gears, 83% extra choice in geared speeds (¼ to 26 mph) for increased accuracy and more effective application of power to difficult work.
6. 100% additional backing-speed selection that cuts waste time on return cycles, improves production on back-up grading.
7. 19% more front-axle clearance to work larger windrows and come in and out of ditches without interference.

In addition, all gears in the "660" constant-mesh transmission are on anti-friction bearings for easy operation, less wear, less maintenance cost. Adams rubber-mounting of engine keeps vibration from traveling to machine and operator. Automatic braking of "660" transmission, when applying hydraulic brakes to wheels, gives you safer operation with less wear on brake linings, and less pedal effort. Because "660" power-box clutches shift on ball bearings, you have less wear . . . easier, smoother-operating controls.

It's a good time now to review your grader equipment, a good year to make needed replacements before the big rush comes to fill needs of the huge expansion in new federal-financed highway construction. We'll be glad to help you make a fair and realistic analysis of your grader equipment and grader needs. We'll be glad to give you every opportunity to compare the Adams 660 . . . or smaller models . . . with your present equipment or with *any* competitive grader.

Wouldn't *now* be a good time to talk it over? We can give you better deliveries and better deals now than we can later on . . . that is, if we can prove to you that we have the best grader for *your* work, and if you decide that now is the time for *you* to buy.



Multiply the uses of your Adams grader with optional equipment: Scarifier, for ripping old asphalt and hard-packed surfaces; Bulldozer, for pushing debris from grade, backfilling around culverts, etc.; "V" Snow Plow and Wing, for cleaning highways and country roads of snow and ice; and Elegrader, for plowing and loading, or sidecasting materials.

### A size ADAMS for every need

**Model 660**—150 hp diesel engine, 27,730 lbs.
**Model 550**—123 hp diesel engine, 23,500 lbs.
**Model 440**—104 hp diesel engine, 21,500 lbs.
**Model 330**— 80 hp diesel engine, 20,500 lbs.

**TraveLoader** — A high-speed, heavy-duty, self-propelled, belt-type loader for picking up materials and loading into trucks from windrows or stockpiles, 55 hp gasoline or 60 hp diesel engine, 16,800 lbs.

AG-29-G-b

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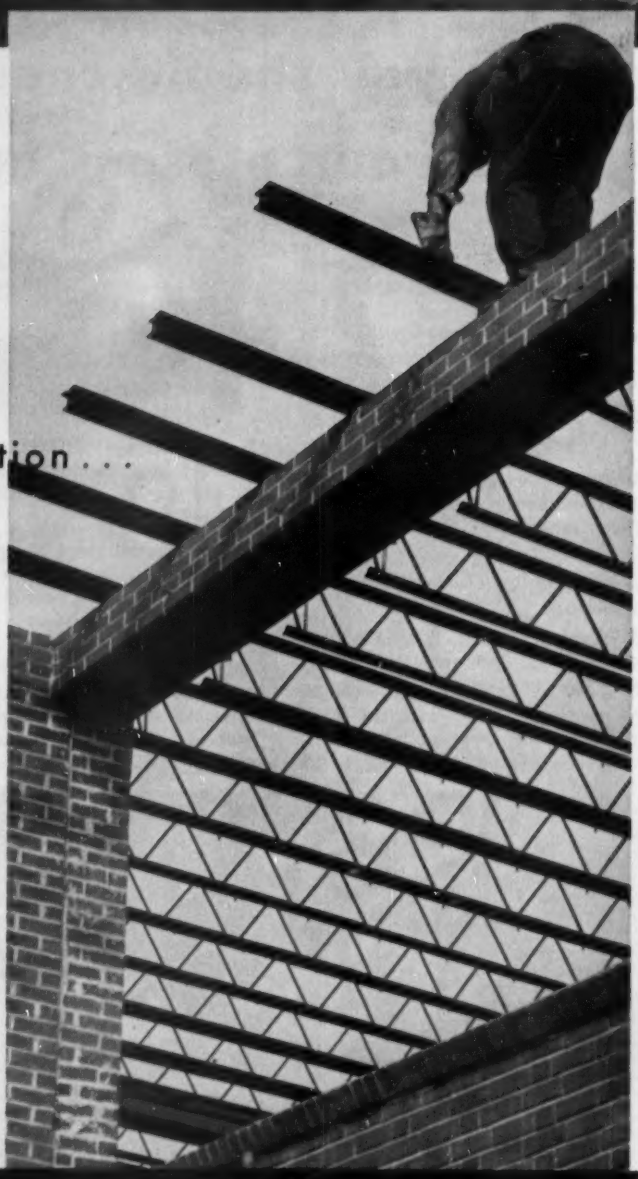
# LIGHTNESS AND STRENGTH

## combine in LACLEDE open web STEEL JOISTS

## for fast, durable construction . . .



Versatile Laclede steel joists were used to their best advantage in this handsome new school in suburban St. Louis.

Laclede joists are easy to handle and place, and are prefabricated to speed the job.

Their high strength and light weight provide substantial savings in foundation and framework. Utility conduits, pipes and lines are easily threaded through the open webs.

LACLEDE

STEEL JOIST INSTITUTE MEMBER

**LACLEDE STEEL COMPANY**

SAINT LOUIS, MISSOURI ◆ Producers of Steel for Industry and Construction

# New Whiteman Twin

## does the work of two ordinary finishers!

- Combination floating-finishing trowels!
- Instant trowel-pitch adjustment!
- Protected ball thrust bearings make trowel adjustments easier!
- Timken bearings in gear case!
- Works 5 feet in one pass!

FINISHES FULL 5' WIDTH

The new Whiteman TWIN Floating-Finishing Machine finishes more slab with one man than two large diameter ordinary machines with two men! Already acclaimed by contractors as the most satisfactory "big job" machine. Easier handling — even by less experienced operators. The counter-rotating, "no-torque" trowels mean steadier, smoother operation. The wide pattern shows up and corrects irregularities instantly, assures perfect results never before obtainable.

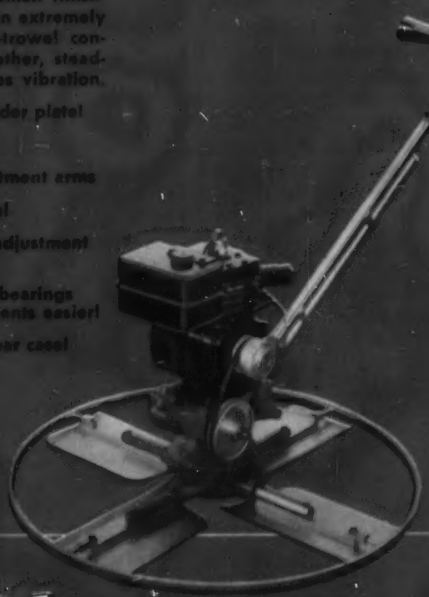
**ALSO NEW!**

**Whiteman 3-4**

**Four-trowelled workhorse**

This rugged new Whiteman finishing machine produces an extremely smooth slab. The four-trowel construction provides smoother, steadier performance, reduces vibration.

- Heavier, stronger spider plate!
- 1" Hex. trowel bar!
- Huskier trowel adjustment arms
- Safety-switch on grip!
- Instant, easy trowel adjustment while operating!
- Protected ball thrust bearings make trowel adjustments easier!
- Timken bearing in gear case!
- 24" diameter!

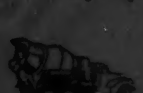


Whiteman — pioneer builder of concrete finishing machines, has sold more power finishers than all other makes combined!

Your Whiteman distributor will help you select the machines best suited to your needs.

# Whiteman

THE LEADER IN CONCRETE EQUIPMENT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## Here are important facts for the "man behind the gun"

## This White 18" Dumpy level has ...more of the features you want, yet costs you less!

Before you buy, compare this White Dumpy level with a similar model of any other recognized make. From every standpoint — design detail . . . quality construction . . . work-speeding, life-lengthening features and cost — you'll quickly see why a White's the best buy you can make. It will make your work faster, easier, more accurate. Check this comparison chart:

| FEATURES | D. White No. 7080 | Instrument A | Instrument B |
|---|---|---|---|
| Magnifying power of telescope | 35X | 30X | 27X |
| Distance away you can read 1/100 ft. graduation | 1200 ft. | 1050 ft. | 900 ft. |
| Diameter of objective lens | 1.81 in. | 1.485 in. | 1.69 in. |
| Field of view (in minutes of arc) | 44' | 52' | 60' |
| Coated optics | YES | YES | YES |
| Covered leveling screws | YES | YES | YES |
| Can you easily replace worn leveling screws in the field? | YES | NO | YES |
| Sensitivity of level vial (in seconds of arc per 2mm of graduation) | 20" | 20" | 25" |
| Price — complete with carrying case, tripod and accessories — F.O.B. factory | $305.00* | higher | higher |

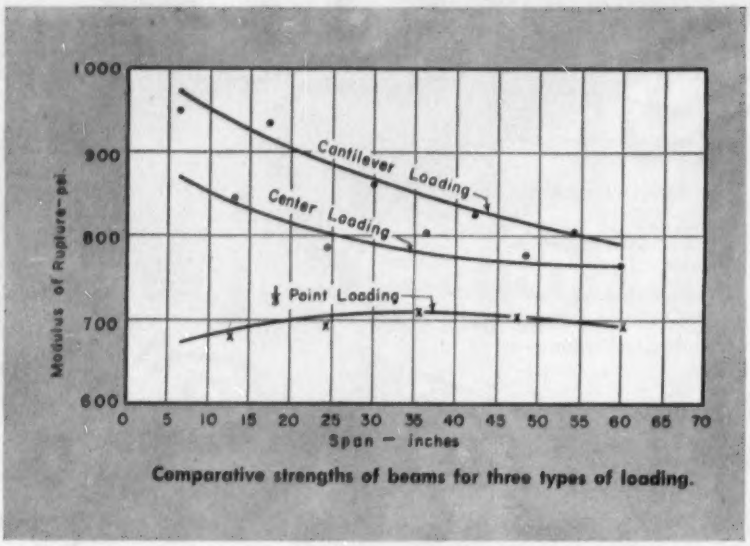
For complete details on the 18-in. Dumpy level and other equally fine engineering instruments, see your David White dealer, or write direct to David White Co., 511 W. Court Street, Milwaukee 12, Wisconsin.

DAVID WHITE COMPANY

*We offer complete, expert repair service on all makes, all types of instruments.*

*Price subject to change without notice.


**PAVING... Continued from page 144**




**Comparative strengths of beams for three types of loading.**

them can be made in a field laboratory equipped with sieves, scales, and a drying oven.

After acceptance of a supply source, tests during construction usually will be routine determinations of moisture content and sieve analyses to check uniformity of aggregate gradation. Many specifications require that the grading must not only be within specification limits but also must conform closely to the grading of the sample submitted for suitability tests. There often is a requirement that, if there is a marked change in grading, concrete proportions shall be restudied and the mix revised, if necessary. The allowable change in grading generally is expressed as the difference in the fineness modulus, a limit of 0.2 being specified in most cases.

The fineness modulus is determined by adding the percentage by weight retained on the following sieves and dividing by 100: 3-in., 1½-in., ¾-in., ⅜-in., No. 4, 8, 16, 30, 50, and 100.

The fineness modulus of concrete sands ranges from about 2.20 to 3.20. Those having fineness moduli of from 2.20 to 2.60 may be classified as fine sands, from 2.60 to 2.90 as medium sands, and from 2.90 to 3.20 as coarse sands.

Coarse aggregate for concrete pavement is subjected to tests similar to those made on fine aggregate except that the test for organic impurities is not used, and a test for percentage of wear is almost invariably added.

### Tests of Concrete

During construction, freshly mixed concrete should be tested for consistency and air content. These tests should be performed at frequent intervals to check on compliance with specification requirements. They also should be made whenever beams or cylinders are made for strength tests.

For many years the slump test has been the standard method for determining the consistency of concrete. In recent years a new test known as the Kelly ball has gained considerable popularity. This test consists of placing a 6-in. dia ball weighing 30 lb on a level surface of the concrete and measuring its penetration. The main advantage of this test is the ease and speed with which it can be made and the fact that consistency can be measured after the concrete is in place in the slab.

Good correlation can be obtained between slump tests and those made with the Kelly ball. Generally the penetration of the ball is somewhat less than the slump as measured by the conventional method, so a limited number of each type of test should be made to establish the relationship.

The rapid increase in the use of air-entrained concrete has been accompanied by many advances in the method of measuring the amount of entrained air. Early methods involved determination of the unit weight of the concrete and required an intimate knowledge of

*(Continued on page 152)*

announcing.....NEW...ALL NEW

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PORTABLE RADIOPHONES

## *UNPRECEDENTED PORTABLE PERFORMANCE THROUGH TRANSISTORIZED CIRCUITRY*

**HIGHEST RF POWER** . . . New **HANDIE-TALKIE** radiophones are the *most powerful* portables ever built—up to 20 times greater power output gives you greatly extended coverage and clearer messages.

**LOWEST OPERATING COST** . . . Battery life and reliability is significantly improved. Dry battery replacement costs reduced by as much as 67%. Nickle-Cadmium storage batteries are lifetime rechargeable. Every component conservatively operated for longest life—top-notch performance Transmitter "I.D.C." Instantaneous Deviation Control and receiver "**PERMAKAY**" filter plus modular construction make these new portables obsolescence-free.

**MAXIMUM PORTABILITY** . . . Featuring transistors, exclusive PLA-cir plated chassis and all-aluminum housings, the **HANDIE-TALKIE** radiophone is smaller and lighter than ever—as much as 50% reduction in weight and size.

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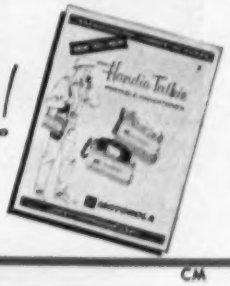


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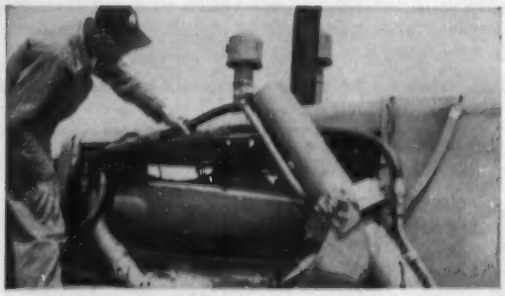
# "Reusable Hose Fittings are a Big Aeroquip Advantage

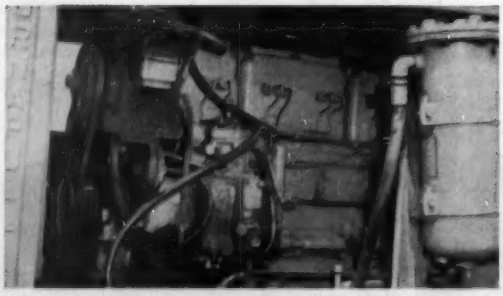
**. . . THEY CUT REPLACEMENT COSTS, REDUCE INVENTORY", says Glasgow, Inc., Glenside, Pa.**

**Large construction equipment operators like Glasgow, Inc. depend on Aeroquip for quick, low-cost fluid line replacement. Aeroquip flexible hose and reusable fittings make it possible for Glasgow to replace air, oil and hydraulic lines right in the field. Portable inventory includes low, medium and high pressure hose. Master mechanic L. N. Petri makes factory-quality hose lines in minutes using ordinary bench tools.**

**Save time with dependable Aeroquip hose lines on your equipment. See the distributor listed in your Yellow Page Telephone Directory, or write for Bulletin 152.**



**Aeroquip high pressure hydraulic lines on this dozer withstand constant flexing and abuse.**



**Aeroquip medium and low pressure lines give dependable service on this self-propelled scraper engine.**

Aeroquip

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**AEROQUIP CORPORATION, JACKSON, MICHIGAN**

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# Your Brunson Instrument Stays Accurate Where Others Fail!

Engineer's Transit Model 50

## DUSTPROOF BALL BEARING CONSTRUCTION Makes the BIG Difference!

As every experienced operator knows, the problem in surveying instruments has not been to get accurate instruments, but to *maintain* their accuracy and operability. It took Brunson, with a radical departure from old, "conventional" basic designs, to come up with the answer — dustproof ball bearing construction!

Located in the spindle and telescope axis, Brunson ball bearings are permanently lubricated by an all-temperature grease and sealed against dust and moisture. Preloaded and accurate to 5-millionths of an inch, these ball bearings provide highest possible instrument accuracy. With dust sealed out and lubricant sealed in, wear is practically eliminated by the smooth ball bearing action. That's why your Brunson instrument stays accurate and operable year-in-and-year-out, where others fail. You save hundreds of hours in on-work time, avoid costly errors, slash routine repair and maintenance expense to a level undreamed of in the past.

You pay no more for Brunson instruments with exclusive ball bearing construction. Mail coupon today.

### You Get These Advantages, Too!

**Wobble Pin in Tangent Screw Point**—Enables your Brunson instrument to stay "on point" by eliminating strain and wear points that cause slippage.

**Long and Short Shots in Collimation** — Long and short shots are all in exactly the same straight line.

**Sturdy, Heat Treated Cast Truss Standard** — Can support over 200 pounds without bending or warping.

*Extra-Strong Fiberglas Cross Wires. Sharp Focus. Coated Lens System. Wide Field of View. Flush Fitted Graduations. Covered Replaceable Leveling Screws.*

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Name_____ Title_____

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**PAVING...Continued from page 148**

the exact weight of each component of the mix and its specific gravity. These were not too difficult to obtain in the laboratory, but under field conditions this method proved laborious and subject to error.

Soon a method was developed to determine the air content by applying pressure to the concrete. Equipment for making this test has been greatly simplified, and the method has been adopted as a tentative standard by the American Society for Testing Materials.

**BEST TEST of hardened concrete is the flexural strength test which determines when the concrete has gained sufficient strength to open the pavement to traffic.**

The search for easier testing methods continues. A small meter which determines the air content of concrete by testing only the mortar fraction has been developed. This test involves the agitation of a sample of mortar (of material passing the No. 10 sieve) in a vial of isoprophyl alcohol. As the device is calibrated for a mix consisting of 55% –4 material, the only data in regard to the mix needed to obtain its air content are the proportions of +4 and –4 material. Conversion factors are furnished for concretes with more or less –4 material. Reports indicate that air content as measured by this so-called "vest pocket meter" check within a few tenths of 1% with results of tests by ASTM tentative standard methods.

Tests of hardened concrete are either flexural or compressive strength tests. Critical stresses in concrete pavement are flexural so this type of test should be used whenever equipment is available. Specifications usually state whether the tests are to be made by center or third-point loading. Relative strengths as measured by these two methods are shown in the diagram. For the 18-in. span commonly used, tests made by center-loading equipment show strengths averaging about 15% higher than when third-point loading is used.

The method of handling flexural test beams just before testing is important. Beams which have been stored in water or in a moist room should be tested immediately after removal from storage. Delay in testing after removal, permits the outside of the beam to dry and results in an apparent loss of strength. *(Continued on page 156)*

# How to choose the BEST Portable Generator

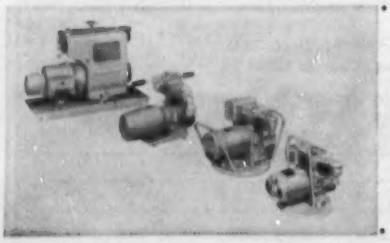
The best generator for your money is dependable; trouble-free; lightweight, but sturdy; and the right size for you.

Sure. But how do you know that when you see it?

Well, you'll look for the best *engine* you know of . . . nothing less than a Briggs & Stratton or Wisconsin . . . connected *directly* to the generator. That combination means the least trouble; most dependability.

You'll check the facts on weight and sturdiness for the size generator you want and be sure service and parts are nearby.

And you'll find, if you choose carefully, that you've picked a MASTER generator . . . so you'll call your Master distributor. He has what you want.



EIGHT NEW GREAT MODELS

All are portable with air-cooled, automatically governed, 4-cycle Briggs & Stratton or (on larger sizes) Wisconsin engines. From 750 watts to 5 KW; AC or DC. Dual voltage available. Write for specifications or see your Master distributor.

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241 Stanley Avenue, Dayton 1, Ohio

## ". . and it REALLY moves material!"

"It's a good rig with plenty of power. We like its ease of operation — and it *really* moves material!" says E. R. Powers, Asst. Superintendent of Ritchie Bros. Const. Co., Wichita, Kansas, referring to this 1½ cu. yd. HOUGH model HH "PAYLOADER" purchased in July, 1955. This contractor knows what the score is on tractor-shovels, for they've been using them for years and have five "PAYLOADER" units.

You, too, can depend on the proven performance of "PAYLOADER" tractor-shovels — built by Hough, the pioneer and leader in unit design, 4-wheel-drive and just about every other noteworthy advancement in wheeled tractor-shovel development. You can depend too on the complete and prompt service provided by the Hough Distributor organization at home and abroad.

This model HH is one of three completely-new 4-wheel-drive "PAYLOADER" models that are finest in Hough history. They all have a sensational new kind of bucket arm design that gives 40 degrees of bucket tip-back at ground level, powerful pry-out action, plus unusual safety, stability and visibility.

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Send data on new 4-wheel drive units

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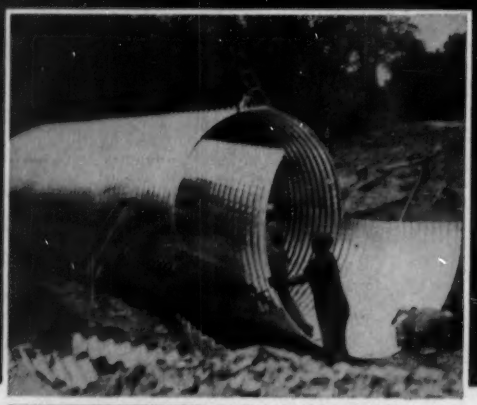
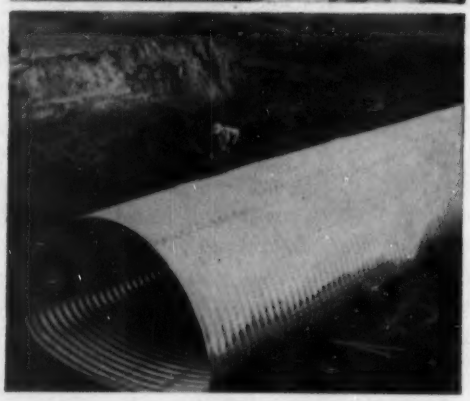
# A new service by American Bridge to help you build low-cost drainage structures in record time

## AMBRIDGE SECTIONAL PLATES

for pipes, arches and pipe-arches





**AmBridge Sectional Plates** are designed to save you valuable time and money in building low-cost drainage structures.

Made from USS Pure Iron or USS Copper Steel (whichever is stipulated in your particular specifications), AMBRIDGE Sectional Plates for pipes, arches and pipe-arches are fabricated to meet the specifications of the American Association of State Highway Officials and can be adapted to all state, railroad and government specifications.

AMBRIDGE Sectional Plates are fabricated in 2" deep corrugations on 6" centers with standard punching. *They are galvanized after fabrication.*

AMBRIDGE Sectional Plates are furnished to accommodate any shape or size of pipe, arch, or pipe-arch complete with bolts. Special details, such as asphalt coating, hook bolts, beveled ends, and skewed ends, are furnished as specified for each job.

**ASK FOR DESCRIPTIVE FOLDER.** For further information about AMBRIDGE Sectional Shapes, we suggest that you contact the office nearest you. Or, an inquiry direct to our Pittsburgh headquarters will bring detailed information. Just ask for the folder on Sectional Plates.

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**AMBRIDGE** *Sectional* **PLATES** USS

**UNITED STATES STEEL**

# DOWN TIME... ZERO

Nothing gives hose a worse beating than a pile driver. And here's hose built to take it . . . day in and day out! Thermoid Powerflex Pile Driving Hose has the brute strength that assures longer wear, fewer replacements. *You can forget about down time.* Yet Powerflex is lightweight, flexible, kink-resistant, easy to handle.

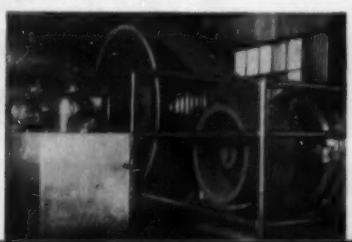
### *No wonder it's tough . . . look how it's made*

- Heat and oil resistant tube.
- High tensile braided steel wire reinforcement prevents bursting . . . gives flexibility.
- Special pattern of the wire braid develops positive lock of tube and cover to reinforcing structure. Mechanically bonded insulating plies assure homogeneous body structure.
- Internal stress of the hose under pressure is completely absorbed by the wire braids, not the insulating plies.
- Tough, specially compounded cover resists abrasion and aging.

Thermoid Powerflex Pile Driving Hose is only one of many types of Thermoid hose built to give the construction industry longer service and lower operating costs. The Thermoid Distributor in your area carries a complete line of Thermoid Hose, Multi-V Belts and Conveyor Belting, to meet the most exacting needs of every job.

**Cut costs with Thermoid Conveyor Belting . . .**

**. . . and Thermoid Multi-V Belts.**



Thermoid

Thermoid Company, Trenton, N.J.

**PAVING... Continued from page 152**

**CONSISTENCY TEST** *most often employed is the standard slump test. In the background (right), a test beam is fabricated from concrete of the same slump.*

The relationship between flexural and compressive strength is not constant but depends on several factors, including aggregate shape and surface texture. In the absence of data to the contrary, the flexural strength of a given concrete may be estimated at 10% of the compressive strength plus 175 lb. That is, if the compressive strength of 6x12-in. cylinders is found to be 4,500 psi, the flexural strength by third-point loading will probably be about 625 psi.

### Tests of Completed Pavement

Tests of completed pavement measure surface smoothness and thickness. When thickness is determined by measuring the length of cores drilled from the pavement, it is common practice to make compressive strength tests on the cores.

The Missouri Highway Department measures pavement thickness while the concrete is still plastic by placing a metal plate on the subgrade before paving and referencing its location. After the slab is finished, a metal pin is pushed down until it contacts the plate and the thickness is read.

Specifications for state highways where finishing operations are fully mechanized usually limit the permissible surface variation to ⅛ in. in 10 ft. Compliance with specification requirements usually is checked by use of a rolling straightedge. The most commonly used type is rolled along the pavement parallel to the centerline. It has wheels at each end, spaced 10 ft from center to center with a pin at the midpoint. The bottom of the pin is ⅛ in. above the plane of the bottom of the wheels. Any place where the pin scrapes the surface is a high spot which should be ground down or replaced. Frequent checks of the straightedge should be made by stretching a wire around the wheels and measuring the offset to the bottom of the pin, which may wear down under continual use.

A type of straightedge which is rolled across the pavement is used by some engineers. This straightedge has an advantage in that the entire area of the slab can be covered, whereas the type rolled lengthwise of the pavement measures the variations only in the paths along which it is rolled.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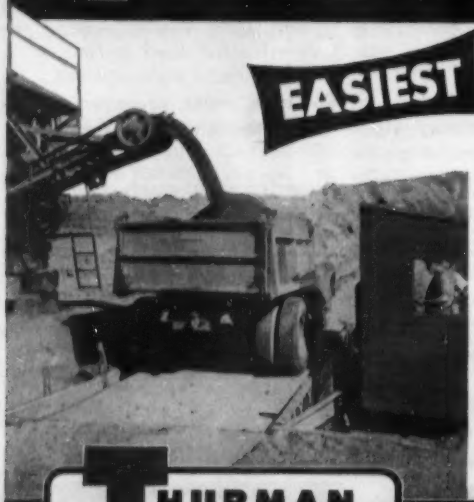

EASIEST Truck Scale to move from job to job

*Eliminate costly concrete pit installations . . . move your scale from job to job. You can, if you weigh with a Thurman Portable. Assured weighing accuracy even under the most difficult conditions. Set on flat, level, hard ground. Make a ramp of earth and gravel at each end. That's it!*

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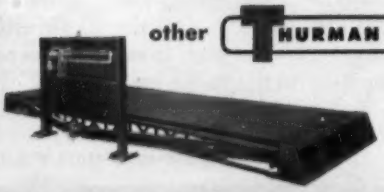

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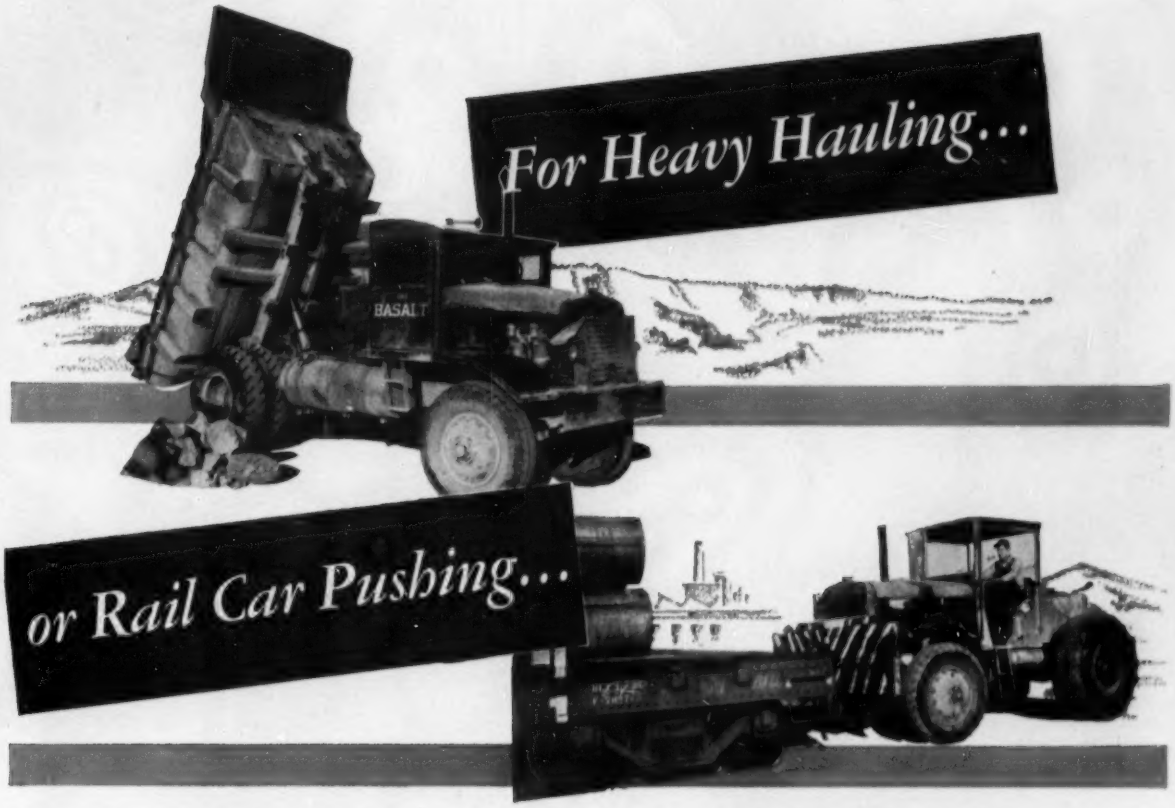


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Twenty Euclid dumps and two tractors converted into "car pushers" . . . *ALL* Fuller Transmission equipped . . . handle tons of the heaviest work around Basalt Rock Company, Napa, California.

Twelve rear dumps and the two pushers are equipped with Fuller 5-A-920 5-speed Transmissions, and the eight Model 9FDT bottom dumps with Fuller 4-B-86 4-speed Transmissions.

In both these applications Fuller Transmissions deliver the horsepower faster. Right gear ratios, short, easier shifts, result in faster work cycles. Heavy rock and gravel hauls for the dumps . . . industrial locomotive loads for the "pushers"—these are the daily jobs that Fuller Transmission equipped units are doing efficiently at the main Napa plant, the Heraldsburg gravel plant, and in the McNear Stone Quarry on San Pablo Bay.

The company started building this fleet of Euclids with Fuller Transmissions in 1938 . . . made additions in 1944, '45 and '46.

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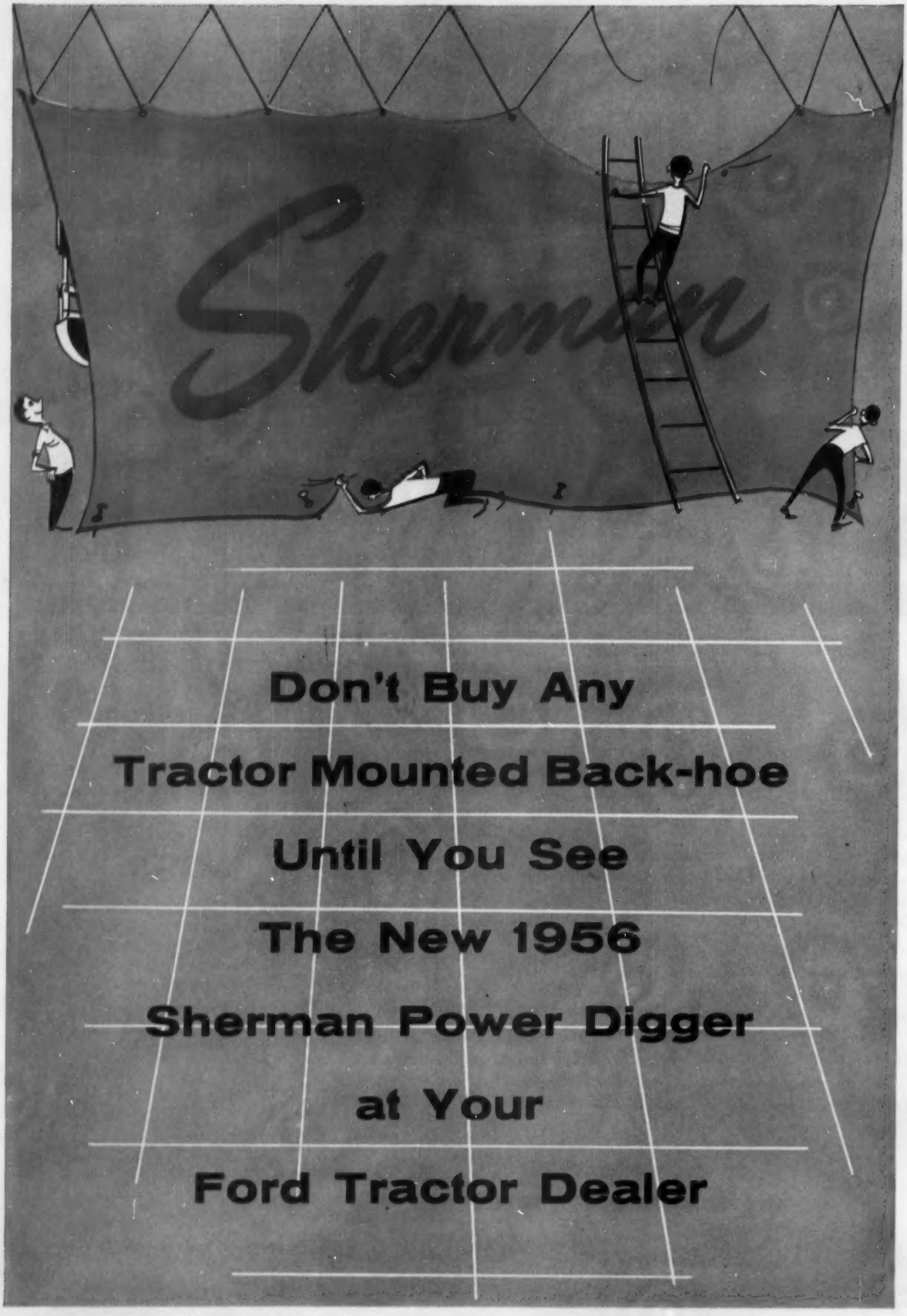
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Until You See
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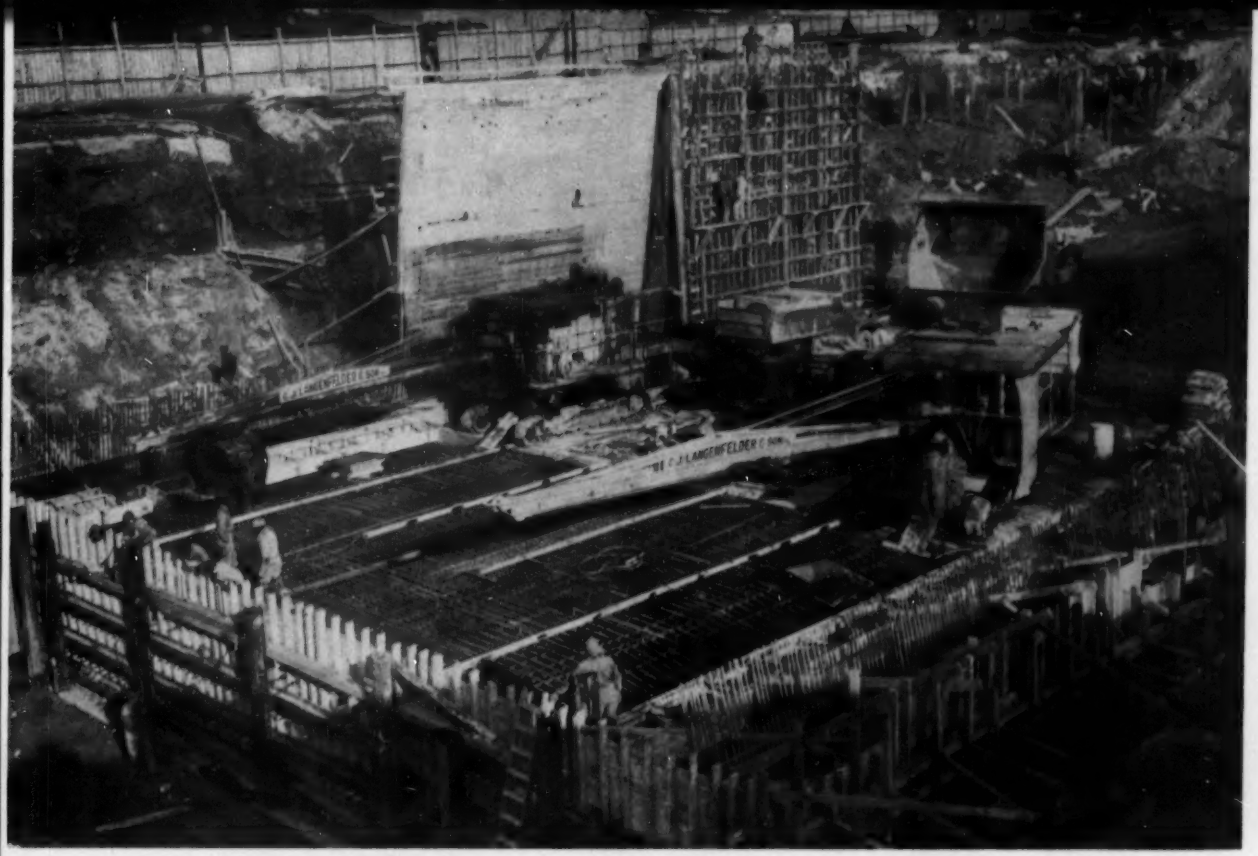
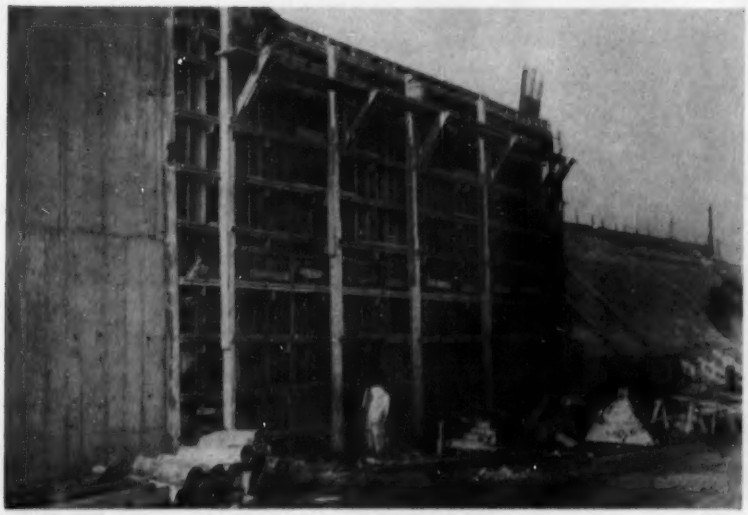


TWO Rex 34E pavers positioned on adjacent completed block in open-cut tunnel approach dump concrete into forms. Fleet of batch trucks feeds pavers. Side forms are braced against bank, but end form is tied back to completed block.

# Twin Pavers Pour Tunnel Invert Blocks



RETAINING WALL form insulated with Balsam Wool between studs permits pours at temperatures as low as 15 deg. No tarps or heaters are required on large-volume pours.

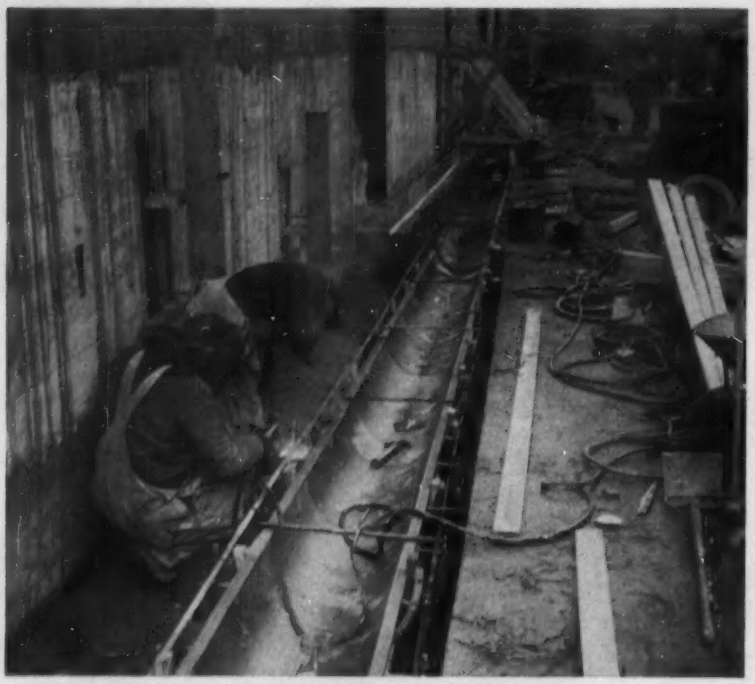
TWO dual-drum highway pavers are proving their worth on the big Patapsco River Tunnel job in Baltimore, Md.

C. J. Langenfelder & Son positions the big rigs side by side to pour massive concrete-block inverts at an open-cut approach. Together, the two Rex 34E pavers place better than 100 yd per hr. They dump directly into forms.

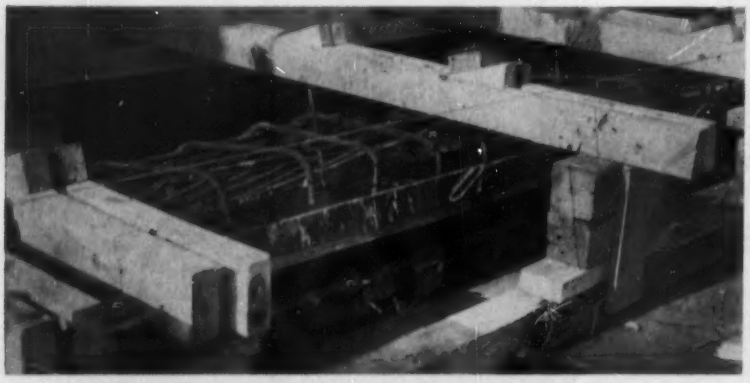
Pavers are paying off because they can pour a huge block in a single day. Blocks are 40 ft long, 88 ft wide, and range from 3 to 14 ft thick. There are thirty in the cut, and the largest contains 1,260 yd of concrete.

Ready-mix trucks were ruled out because they could not get close enough for adequate production, and cranes and buckets would be too slow. Pavers are expensive to operate, but, if kept busy, they are cheaper in the long run. Langenfelder operates them on a rigid schedule. Between block pours, pavers team with cranes to place concrete for big retaining walls on each side of the invert. In this way, concrete production averages better than 375 yd a day.

But placing is only one problem. It takes a hefty form to support 14 ft of concrete for an invert



HALF-ROUND tile-pipe sections for gutter are cradled in reinforcing and secured by welding bars across top. Brackets hold sections down as concrete is poured.



FORM for concrete sidewalk and curb that cantilevers over curb consists of plywood panel hung from walers supported on blocks. Steel angle at panel edge forms curb.

CANTILEVERED sidewalk and curb cure as forms for adjacent section are erected. Tricky structure requires three pours. Third pour completes lip along outer edge of gutter.

block. On the sides of the blocks, heavy wood panels are braced against the bank. But on the open end, wood panels, backed by heavy steel studs and walers, are tied back to the adjacent completed slab with Richmond 4-strut ties. Six ties are spaced along the form about 2 ft from the top, and another six are spaced 2 ft from the bottom. They are covered by small Sonotubes so that they can be removed after the pour. If left in, Tyscrews at the joints would prevent expansion and contraction.

Another big problem is sliding of the big blocks right after pouring. Although the base of each block is level, the top is poured at a 3% slope. This unbalancing is enough to cause the entire block to slide on its slippery brick-in-mastic waterproofing underneath.

In a few areas, the contractor eliminates the problem by pouring successive blocks uphill, allowing the completed blocks to hold back the poured blocks. But restricted layout requires that most blocks be poured in a downhill direction. To keep them from sliding, heavy bars are tied between the reinforcing in the block and projecting reinforcing in the center mall of the adjacent block. This works successfully.

### It's Tough to Form

Curbs, gutters, and sidewalks provide other forming problems. The gutter consists of half-round sections of 18-in. dia tile pipe cradled in concrete. Over the gutter, concrete cantilevers to make a curb and sidewalk.

It's tough to form. In fact, it has to be made in three pours. Reinforcing is first placed in boxed-out areas at the ends of the invert blocks. Half-round tile sections are laid in the reinforcing and secured by welding additional bars to the reinforcing. Wood brackets bolted to the retaining walls then are adjusted to hold down the tile sections during the pour. Concrete is placed about half way up the sides of the tile sections.

The second pour makes the cantilevered sidewalk. Only a bottom form is needed. It consists of a plywood panel hung from overhead beams. A third pour along the outer edge of the tile gutter completes the job. It's a tricky sequence of operations, but there's probably no other way to do it.

H. Crisfield is project manager for C. J. Langenfelder & Son.

# How to beat a fleet of limited-duty rigs

## ...WITH ONE

# International® Drott 4-IN-1

**Beat a power shovel** wherever exclusive Drott *triple-power, pry-action break-out* is decisive—and where quick International crawler mobility can outspeed and "out-reach" a boom. Break-out force of the three Four-In-One models as Skid-Shovels ranges from 8,500 to 17,000 lbs!

**Gain a 30-inch (or greater) dumping height advantage** over ordinary roll-forward bucket dumping—by using the bottom-dump feature of the Four-In-One as a clamshell. And loading with the clamshell action, get a super-fast bucket-fill on stockpiled materials, even in cramped quarters.

**Get versatile carry-type scraper action** with the Four-In-One in Bullclam position. Using positive clam lip control, spread materials, strip, and grade with amazing accuracy. And as a Bullclam, the Four-In-One *heap-loads* itself with speedy, earth-boiling action!

**Get big dozing capacity** with finger-tip ease with your Four-In-One in bulldozer position. Regulate dozing depth by hydraulic "radius control" of blade pitch. Note the frost-breaking, earth-moving action. Shown here is new 2¼-yard Four-In-One for the International TD-14.

**Prove Four-In-One versatility unlimited** with the 1-yard TD-6, the 1½-yard TD-9, or the new 2¼-yard TD-14 model. Test *exclusive* pry-over-shoe break-out action, and *exclusive* shock-swallowing Hydro-Spring. Ask your International Drott distributor for a Four-In-One demonstration.

International Harvester Company, Chicago 1, Illinois

INTERNATIONAL®

DROTT

# NOW *bid beating... dirt heaping...* 1956

## 10% bigger payloads!

**Model "75"** ... boosted to 20 yds heaped (without sideboards) ... 262 hp.

**Model "55"** ... boosted to 14 yds heaped (without sideboards) ... 172 hp.

Wide-base tubeless tires and windshield, shown, available as optional equipment.

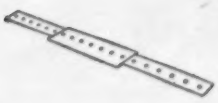
1. **Wider "Target" Push-Block** makes it easier to make and maintain contact. Helps to cut loading and cycle time.
2. **Straight-Line Ejector Reeving** requires minimum power; leaves more power on Payscraper wheels for faster dumping and spreading. Also speeds re-threading time.
3. **Sturdy Cover Plates** protect new, stronger cylindrical ram and air tanks.
4. **New, Straight-Back Bowl** lets you heap and haul more dirt every trip. Struck capacity, *with sideboards*. 18 cubic yds on "75"—12 cubic yds on "55".
5. **Higher Apron Lift,** bigger apron opening, provides cleaner, more rapid dumping, especially of "sticky" materials.
6. **Fast-Acting Apron,** arms mounted outside bowl, assure quick, positive closing of apron. Payscraper holds the load from cut to fill.
7. **Lowered Draft Frame** provides operator with "control tower" visibility of bowl and push-tractor ... also helps direct push and pull power more efficiently to cutting edge for faster loading.
8. **Larger, Wider Fenders** give greater safety for operator, greater protection for machine.

# International Payscrapers®

Put the 1956 International Payscraper to work on your job, and watch dirt boil up into its new, straight-back bowl. You've never seen any big scraper load as easily or as fast. In seconds, you've packed in up to 23 heaped yards. Its offset 3-section blade breaks the ground like a sharp-pointed spade. Dirt boils from the smooth-slicing cutting edge and fills the corners to build a full heaped load. Close the apron instantly, positively, on this huge, well-compacted load and you carry all the dirt you've heaped in.

Now, drive easily, effortlessly with safe hydraulic power steering at a fast clip to the fill. Note how the 1956 Payscraper's extremely high ratio of horsepower to capacity and its rapid acceleration to 24 mph top speed add up to more trips per hour than any other self-powered scraper you've ever used. Yes sir, it's a real profitable dirtmover, this 1956 Payscraper! Try one yourself on your job! See your International Industrial Power Distributor for a demonstration.

**Maximum 52° Oscillation**
from right to left takes the stress and strain out of hauls over furrows, rough ground.



**Adjustable 3-Piece Cutting Edge**
for clean, fast cutting and loading under all soil conditions.



**New, Long-Lasting Clutch**
of ceramic material and powdered metals, successfully resists heat and wear over longer periods. Available on Model 75 only.

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## International Industrial Power

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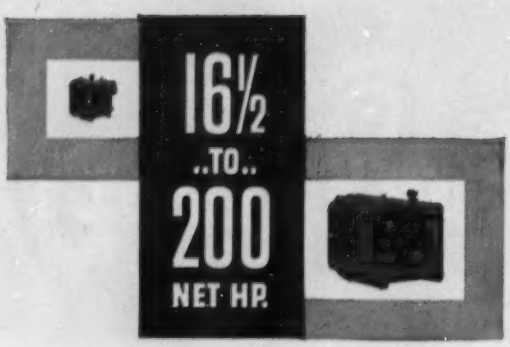


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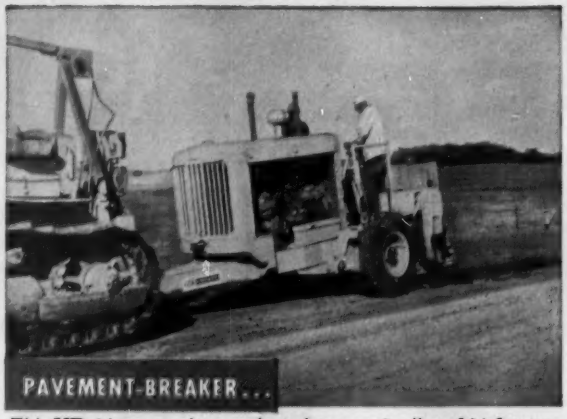
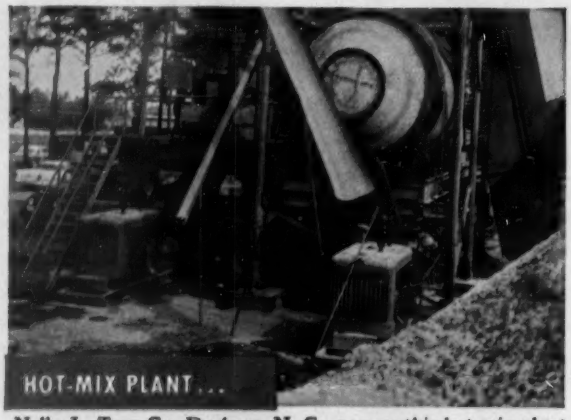
Whether you're buying new machinery, or replacement engines, specify the International power unit size that correctly fits your needs—be it for shovel, mix plant, grader, compressor, sawmill, or crusher. Pick the fuel with the local economy advantage! You'll get a heavy-duty unit with the inbuilt tinkerless simplicity of positive temperature control, that features full-length water jackets. You'll get special-delivery pressure lubrication through drilled passages. You'll get wear-defiant, stress-resistant, induction-hardened crankshaft bearings. You'll get the many other International stay-put, extra-value features. You have the choice of 6 diesel, or 12 carbureted work-proved International Industrial Power Units, 16.5 to 200 hp.

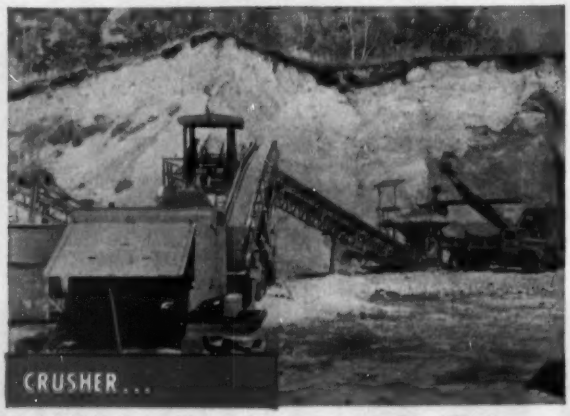



This UD-24-powered preparizer chews up 2 miles of 24-ft pavement per 8-hour day for Contractor G. A. Watson, Barneveld, Wis. He says, "My equipment is International-powered because International engines are dependable, and backed by a company that gives service when needed."




Nello L. Teer Co, Durham, N. C., powers this hot-mix plant with an International 190 hp UD-24 on the tower, another UD-24 at the dryer, and a 125 hp UD-18A on the fan. Plant output on U. S. Hwy 13 job in Maryland averaged 1,000 tons per 10-hour day.

City of Danville (Va.) replaced original engines in two ½-yd shovels with 75 hp UD-350's. "These IH engines sure cut operating costs," says Works Director H. Bowling. Each shovel uses only 17 gal of fuel to produce 95 five-yard loads per day.




In 12,000 hours work over 7 seasons, the 190 hp UD-24 powering Sheboygan County's crusher has needed only one overhaul. It produces 700 tons of crushed stone per average day. "Most dependable engine we know of," says the pit superintendent.

Your International Industrial Power Distributor or Power Unit Dealer is qualified to recommend and install the correct engine size for your needs—and to provide parts and service on it promptly and competently. A good deal awaits you—see him soon!

**International Harvester Company, Chicago 1, Illinois**

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## Stockpiling, ditching, grading, any wheel tractor job...

# NEW INTERNATIONAL® 300 UTILITY TRACTOR OUTWORKS THEM ALL!

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**Tops the field in pull and push-power!** Delivers 4,379 pounds maximum pull at typical operating weight. 39.5 maximum drawbar hp.

**10 speeds forward, 2 reverse** with optional IH Torque Amplifier drive. Operator can change speed in any gear to boost pull-power up to 45% *On The Go!*

**UNLIMITED hydraulic equipment control.** Front and rear-mounted equipment controlled individually or *both at the same time*, using either single or double-acting cylinders—*or both*. Front and rear power drives available for equipment with built-in pumps.

**Fast-Hitch.** Just back the tractor—equipment coupling beams engage *automatically* on rear-mounted blades, scoops, and other Fast-Hitch equipment. Low-cost adapter available for 3-point equipment.

**Power Steer.** Optional. Takes work out of maneuvering in soft, rutted ground; reduces operator fatigue particularly on loader jobs.

Here's a new utility tractor that outperforms and outlasts anything you've seen up to now! It has up to 1,000 pounds more built-in weight to deliver traction where lighter weight utility tractors slip or stall. Big pneumatic tires turn this power and weight into effective traction equally well on paved factory aisles and yards, and on the soft footing of construction and other off-pavement work. *Ten forward speeds to 16.8 mph*, with exclusive Torque Amplifier drive, lets the operator select the best working speed for each specific job.

### UTILITY IS THE NAME FOR IT!

For construction, industry, business, and endless county and municipal applications, the International 300 Utility is easily equipped with fork lift, materials loader, backfill and 'dozer blades, backhoe, grounds maintenance equipment, compressor, crane, hole digger, snow plow, street sweeper, dirt scoop, or any of many others. Your nearby International Industrial Power Distributor will be glad to demonstrate. Phone him today!

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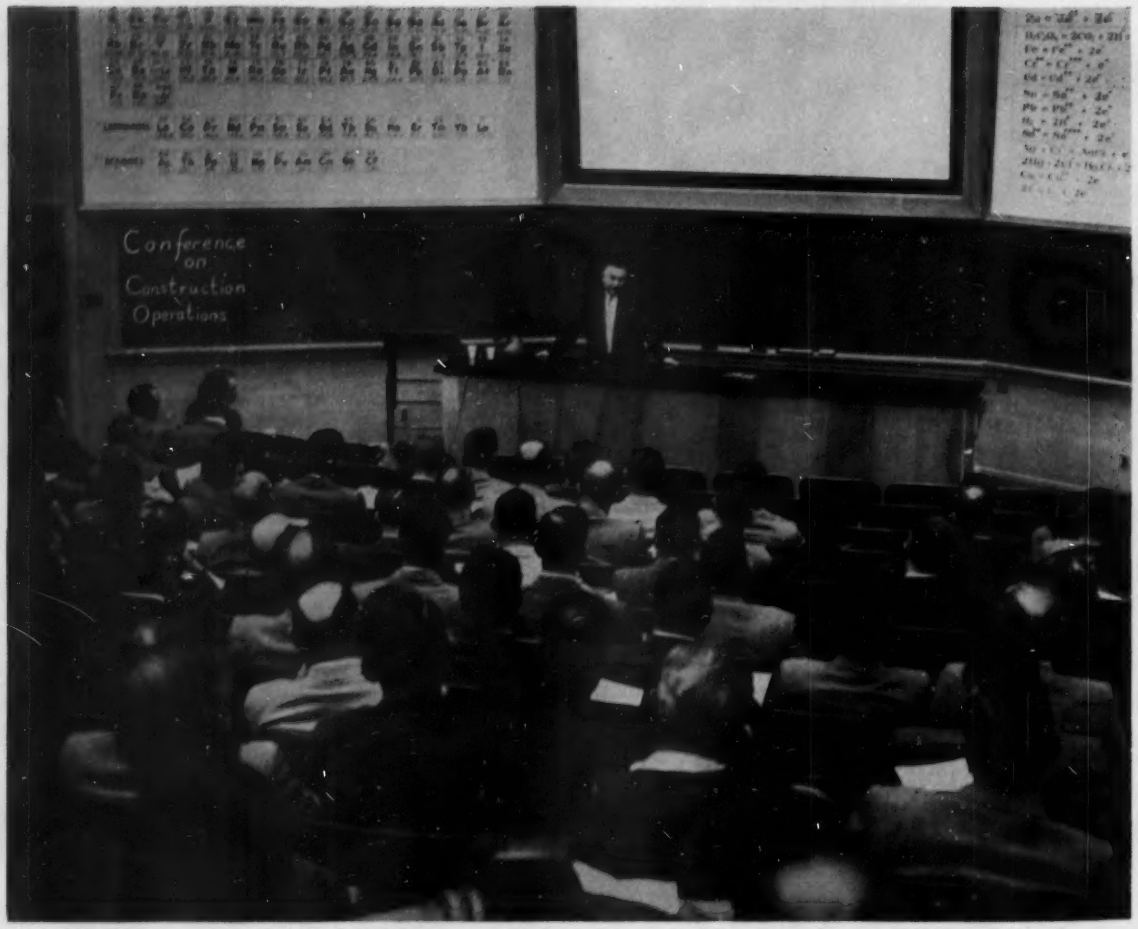


**At UCLA conference, construction men hear experts explain how . . .**

# New Management Methods Cut Construction Costs

By L. L. WISE
Associate Editor

DETAILED PLANNING and follow-up procedures can boost the efficiency of construction operations. That was the theme of a two-day conference at the University of California, Los Angeles, attended by 200 construction men.

Speakers representing some of the nation's outstanding construction firms declared that industrial engineering techniques—like time studies and operations research analyses—can promote cost of savings.

Most of the new management ideas introduced at the conference seemed practicable only for big contractors. There was little a small contractor could take home with him and put to immediate use. But over a period of time, big contractors may refine these industrial management techniques to a point that they will help the small contractor as well and so boost the efficiency of the entire industry.

The conference was sponsored by the University of California at Los Angeles with the American Society of Civil Engineers' Construction Division cooperating. UCLA's Engineering Dean L. M. K. Boelter opened the meeting by challenging construction men to adopt industrial engineering techniques to promote efficiency. He said industrial techniques might be used in construction to improve the flow of materials and information.

### Robert L. Cashen

First of an array of top-management officials from big construction firms was Robert L. Cashen of the H. K. Ferguson Co. Cashen told how his company uses planning engineers and how "preplans" promote efficiency. A preplan is simply letter-sized sheets of paper with a complete analysis of an in-

dividual construction operation. It must cover only one operation so that it can be used at the lowest echelon of supervision. It outlines procedures, lists quantities, man-hours, crafts, refers to drawings and specifications numbers.

On a typical $3 million industrial job, Cashen said 75 preplans were prepared involving 450 letter-sized sheets. He said his company's most successful jobs are those for which 60% to 70% of the work has been preplanned.

Methods to be used for a particular operation as listed on the preplan must often be developed through a methods study. This is an estimate of the time and money required for different ways of doing the same operation. According to Cashen the best planning engineers are relatively recent graduates rather than long-experienced construction men. Newer people have to find out what the best method is, but experienced construction men often just stick to old methods without exploring the possibilities for improvement.

Cashen admitted that planning costs money. But he said the results are worth it. As a minimum, he said, there should be one planning engineer for each $1 million of controllable cost on an industrial project.

### John R. Kiely

John R. Kiely, vice president of Bechtel Corp., discussed cost and schedule control on the job. A schedule or cost unit, he said, must match a single unit of work and a single foreman or supervisor. Cost data for effective control should be prompt. Accuracy is important, but stale data are useless, and extreme accuracy might be too costly to achieve.

Frequent reviews of costs and schedules must be made. On most jobs a weekly review is all right. On some large jobs a review might even be by shifts. Monthly reports are not good enough, according to Kiely.

Cost-consciousness, Kiely said, must start at the top. If the vice-president is interested in keeping costs down, the project manager will watch costs closely. And, if the project manager is wary of costs, his superintendents and foremen will be cost conscious.

### Grant P. Gordon

Heavy construction operations require different types of planning and scheduling than those men-

## *The Speakers . . .*

**Robert L. Cashen**
*H. K. Ferguson Co.*

**John R. Kiely**
*Bechtel Corp.*

**Grant P. Gordon**
*Guy F. Atkinson Co.*

**Lyman D. Wilbur**
*Morrison-Knudsen Co.*

**Gunnar C. Carlson**
*Procter & Gamble*

**Theodore R. Tucker**
*Fluor Corp.*

**Roger R. Crane**
*Operations Research Expert*

**J. J. Christian**
*Los Angeles Building & Constuction Trades*

tioned by Cashen and Kiely, according to Grant P. Gordon, assistant general manager of Guy F. Atkinson Co. Gordon cited the large amount of skilled drudgery that goes into programming a large dam job like The Dalles or McNary. Programming should start during the bid preparation stage, Gordon said. And it must continue throughout the life of the job.

Many factors affect programming, including the over-all time period, work seasons, high and low water periods, intermediate deadlines, required construction sequences, available work area, available plant and equipment, available manpower, isolation of the job, and financing limitations.

Even with all these factors taken into account, Gordon warned, intangibles will appear that might upset the program. These include floods, strikes, change orders, subcontractors failing to deliver on time, and the like. In programming, Gordon said, the first thing to do is to establish critical pivot points, then nail down intermediate deadlines, and finally provide just as much cushion as possible.

Gordon concluded with the comment that the construction industry is in a period of transition. More engineers are being employed by contractors and fewer, in proportion, by government agencies. This means that more of the planning work must in the future be handled by contractors.

### Lyman D. Wilbur

Scientific management organization of a large construction company was the topic of Lyman D. Wilbur, vice-president of Morrison-Knudsen Co., Inc. Wilbur attributed much of the success of his company to a form of organization that places responsibility at the lowest possible level. Authority is delegated to district and project managers insofar as possible. Company headquarters acts largely in an advisory capacity to assist lower echelons in their work.

Wilbur said delegation of authority helps solve one critical management problem—retention of competent personnel. Advancing men as soon as they are capable helps keep good personnel in the company and preserves the organization's most important asset, the men that work for it. In personnel operations of Morrison-Knudsen, special attention is paid in exit interviews to reasons for quitting.

Morrison-Knudsen also places great importance on its in-service training. The company has assisted in the establishment of a preventative maintenance school at Boise Junior College, located in the headquarters city of the company. People from district offices are brought to Boise during the winter months to attend the school.

### Gunnar C. Carlson

Use of industrial engineering techniques in controlling construction operations was described by Gunnar C. Carlson, associate chief engineer of Procter & Gamble Co. Carlson's company spends some $30 million annually on construction. And it believes costs can be controlled on construction operations in much the same way they are in factory operations.

But there are substantial differences, Carlson admitted. Most importantly, construction operations are handled by contractors and not by P&G's own forces. Realizing this, Procter & Gamble got some of its contractors to undertake cost control work as part of the job. This has met with remarkable success.

Carlson lists these cost control steps:

1. *Break jobs down into blocks of work.*
2. *Study methods and alternates to perform the work.*
3. *Break work blocks into elements and combine them into a preplan.*
4. *Show on the preplan how long the operation should take.*
5. *Schedule work from the preplan.*
6. *Evaluate work in progress*
7. *Review the work on completion.*

Carlson emphasized the importance of following the planned work as it is done. As soon as preplans are worked out, he said, planning engineers should spend some 60% of their time in following up on field work. As an indication of how successful Procter & Gamble's cost control work has been, Carlson said $1 spent on planning has saved $2.50 in construction costs.

### Theodore R. Tucker

Use of models in controlling construction operation was an idea propounded by Theodore R. Tucker, design supervisor for Fluor Corp. Fluor has a model-building staff that assists in design work. And Fluor uses models of equipment to see if erection clearances are proper.

After design is completed, according to Tucker, the models go out to the field so the construction people can see what is needed. And large-scale, blueprint size, photos are made of the models. In many cases, these substitute for plans. They give field forces a way to grasp what they are attempting to achieve much more quickly than blueprints.

### Roger R. Crane

In attempting to spur construction people to use industrial engineering techniques, a presentation was made on operations research. Roger R. Crane, formerly director of operations research for Westinghouse Air Brake Co. and now with Touche, Niven, Bailey & Smart, Detroit certified public accountants, described operations research methods used in industry. This semi-mathematical analysis of repetitive operations has proven effective in many fields.

It was hard for many construction people in attendance to see how they could benefit by such techniques as operations research. But others were enthusiastic and could hardly wait until they got a job big enough to warrant techniques using such as described by Crane.

### J. J. Christian

One deterring thought was expressed by J. J. Christian, secretary of the Los Angeles Building & Construction Trades Council. In Christian's opinion it doesn't seem likely that construction operations can be performed by robots. He feels that the individuality of each construction job makes automation unlikely.

Christian also spoke of the recent AFL-CIO merger. He said that he was aware that many contractors are worried about a possible adverse effect. But he looked for only good to come from the merger insofar as the construction industry was concerned.

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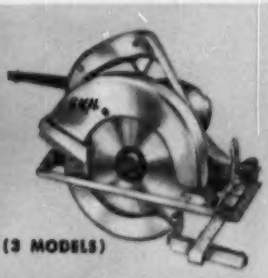
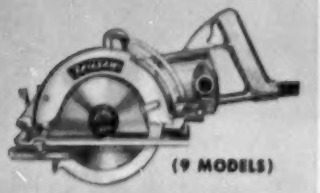


(3 MODELS)

**Heavy-Duty SKIL Saws**

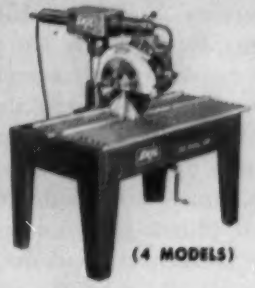
**High blade speed for fast, unequalled cut-off work. Exceptionally lightweight and easy-to-handle. 3 popular-priced models for the professional user—in 6½", 7¼" and 8¼" blade sizes.**



(9 MODELS)

**Super-Duty SKIL Saws**

**High-torque worm drive means peak power for gang-cutting, heavy ripping, tough bevel mitering, cutting metal and compositions. Lightweight, easy handling. Blade diameters from 6" to 12."**



(4 MODELS)

**SKIL Radial Saws**

**Exclusive "Retracto-Glide" Arm gives hairline accuracy for high speed pre-cutting. Ideal for multi-unit construction. Sturdy, heavy-duty design throughout. 2 to 7½ HP models.**

**SKIL offers the most complete line of saws on the market**—value-packed models for every building job, from cutting thin sheathing to heavy timbers. Powered to keep cutting at top speeds where others fail—under all conditions, through all materials. Built to stand up longer under constant, rugged use. Built for professional builders!

Plan now to boost your production during the busy season ahead. Save time and money—cut maintenance costs—with the right saw for *your* cutting needs. SKIL Saws are famous for peak cutting speed, power, accuracy and ease of handling! Ask your SKIL Distributor for full details.

***OVER ONE MILLION SKIL SAWS IN USE***

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Up it comes as the operator slides the cutting-edge under the concrete and applies break-out action. Photo shows how the slab usually breaks before it topples over.

# Authorities forbid breaker ball, so contractor removes 8″ concrete with 2¼-yd. Michigan

Contractor Roberts E. Latimer, Jr., Inc., Silver Spring, Maryland, ran into trouble on a recent job. The contract called for removing a stretch of highway where the concrete slabs were 8-inches thick by 12-ft. wide. When they bid the job they expected to break up the slabs with a breaker-ball. But when they went to work, authorities told them that a decayed 14-inch gas main ran underneath the road. "No breaker-ball—too dangerous."

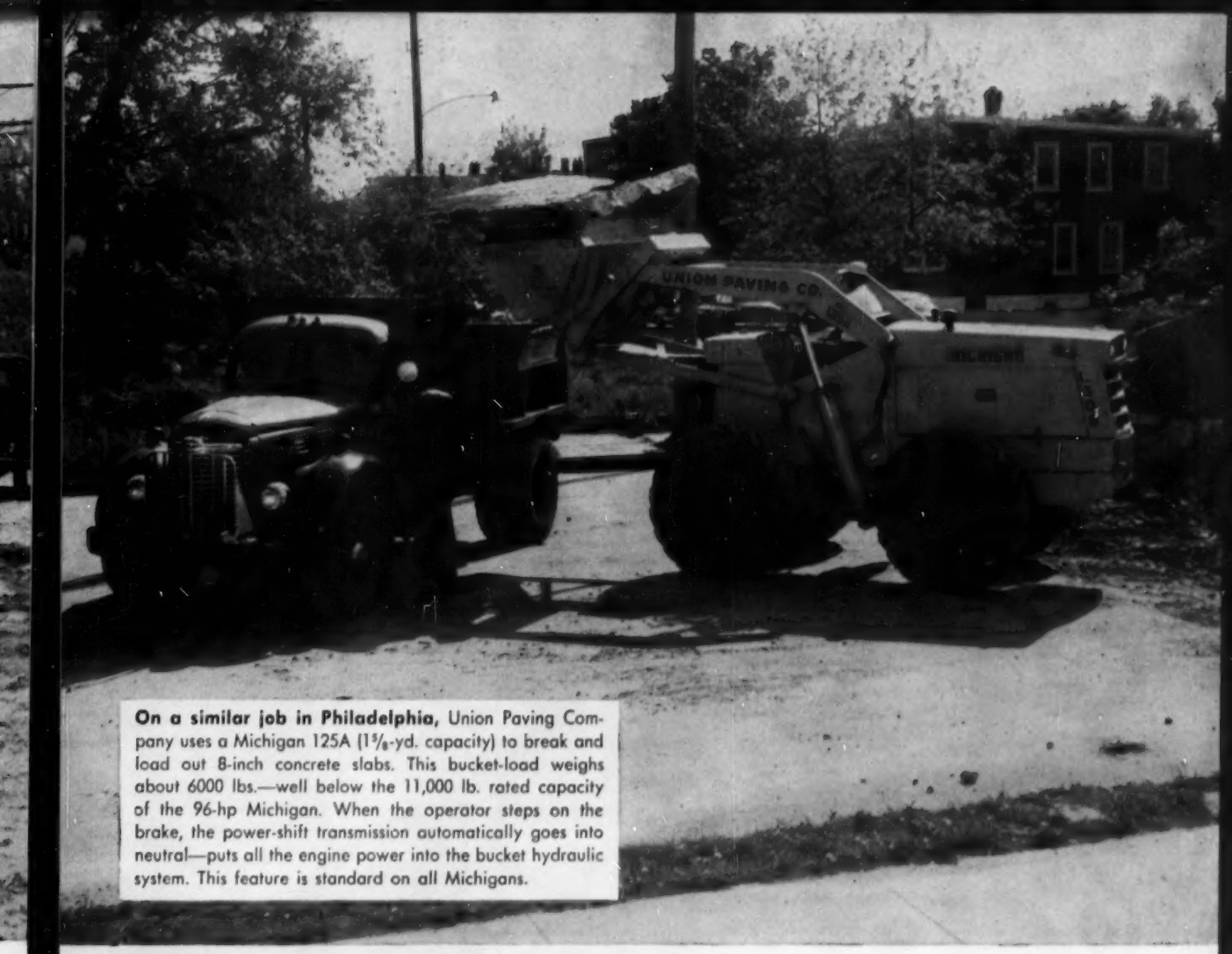
## Crane wouldn't work

Latimer tried to break out the slabs with a ¾-yd. crawler shovel; it wouldn't work. Next they tried a crawler-loader; it didn't have enough lifting capacity or break-out power either. At this point Paving Supply and Equipment Co., Washington, D. C., suggested that they try a 2¼-yd. Michigan Model 175A on the job. Latimer frankly didn't believe that *any* type of loader could break out the heavy slabs —much less a rubber-tired machine. But they finally agreed to let the distributor demonstrate the Michigan. When they saw, they bought.

## Michigan's exclusive break-out action

The photograph on this page shows how the 133-hp Michigan handles the job. The operator slips the bucket cutting-edge under the slab. Then he applies bucket break-out action. When the slab has lifted about 2 feet, he eases forward, gets under the slab as he lifts the bucket. The concrete usually breaks as it's being raised. If it doesn't break, the Michigan pushes it over the curb to a spot where the breaker-

(Advertisement)




**On a similar job in Philadelphia,** Union Paving Company uses a Michigan 125A (1⅝-yd. capacity) to break and load out 8-inch concrete slabs. This bucket-load weighs about 6000 lbs.—well below the 11,000 lb. rated capacity of the 96-hp Michigan. When the operator steps on the brake, the power-shift transmission automatically goes into neutral—puts all the engine power into the bucket hydraulic system. This feature is standard on all Michigans.

ball can be used safely. Then the Michigan loads out the chunks.

## Moral: see it in action

Like Roberts E. Latimer, Jr., Inc., more and more contractors are using Michigan Tractor Shovels as construction prime-movers. It's no accident that this machine will handle jobs that have never even been attempted on rubber. The complete Michigan power-train—torque converter, power-shift transmission, planetary axles—was designed and built by Clark to give this machine more useable power and traction than you've ever seen on any rubber-tired tractor shovel. Before you decide that this type of machine can't handle a particular job, do what Latimer did. Ask for a Michigan demonstration. *You name the job.*

CLARK EQUIPMENT

Michigan is a reg. trade mark of
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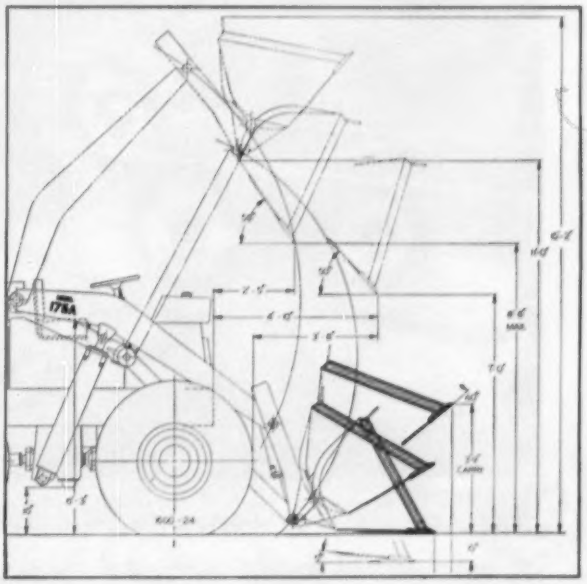
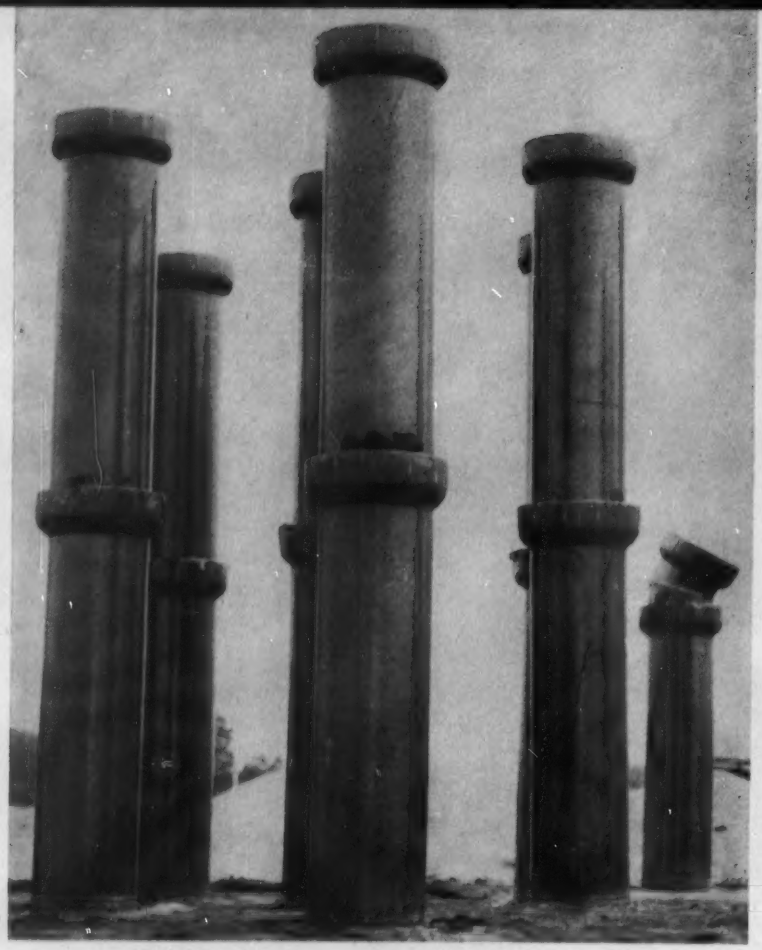
**Construction Machinery Division**
**2403 Pipestone Road**
**Benton Harbor 13, Michigan**

Below: **Low-level breakout force** of the Michigan 175A is applied by two 7-inch double-acting bucket cylinders; the full tip-back is 40 degrees. Note the clean design of the Michigan bucket mechanism—preserves the dumping clearance over truck sideboards.



# Assemble Pipe Sections, Then Lay 21-ft Lengths



**STACK TWO SECTIONS** First step in preassembly is to place one three-ft section of clay pipe on top of another and make a hot-poured bituminous joint.

PREASSEMBLING vitrified clay pipe into 21-ft lengths makes possible a savings of 25% on installation costs. That's the experience of Gaines Construction Co., Miami, Fla.

Gaines is assembling seven 3-ft sections of pipe on templates above ground for installation as sewers at Carol City, Fla., a 10,000-home project the firm is building 14 miles from Miami.

The job will require more than 350,000 ft of pipe as laterals and mains. So far Gaines has laid about 275,000 ft of pipe ranging from 6 in. to 15 in. dia.

First step is to place a 3-ft section of pipe with spigot on the ground vertically, set another section of pipe with bell on top of

**ERECT TEMPLATE** Seven section lengths of pipe are put together on templates of 14 strips braced with crossbars.

**MAKE JOINTS** Pre-formed joints make connecting the two-length sections easy. Alternating joints are hot-poured.

# The Engineer's Field Report

CASE HISTORY

LUBRICANT *RPM Delo Oils*

FIRM *Murphy Brothers Inc., Contractors, Spokane, Washington*

# Contractor averages 6,000 hrs. between overhauls on 58 heavy-duty engines using RPM DELO Oil

"WE STRETCH THE TIME between engine overhauls with RPM DELO Oils," says Carrol Peck, Maintenance Supt. for Murphy Bros., Inc., road construction and grading contractors. "We never pull an engine down until it goes at least 5,000 hours. One D-7 went 8,000 hours and a 9-year-old UD-14, overhauled at 13,000 hours, was spotless—no sludge, no carbon build-up, all rings free. We've used RPM DELO Oils for more than 7 years and never lost a bearing due to lubrication."

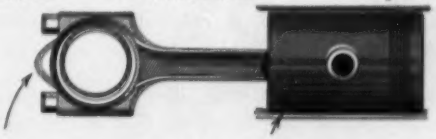
DW-21 scraper (above) has worked 16 months without an overhaul, in temperatures varying from 10° below zero to 100° above. Murphy Bros. entire fleet of 23 tractors and scrapers, 4 HD-20's, 9 shovels and 23 trucks use RPM DELO Lubricating Oils.

## Why RPM DELO Oils prolong engine life

Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps all parts clean



Metal-adhesion qualities keep oil on parts in running or idle engine—inhibitor resists foaming

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" AND DESIGN REG. U. S. PAT. OFF.

For More Information about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies below.

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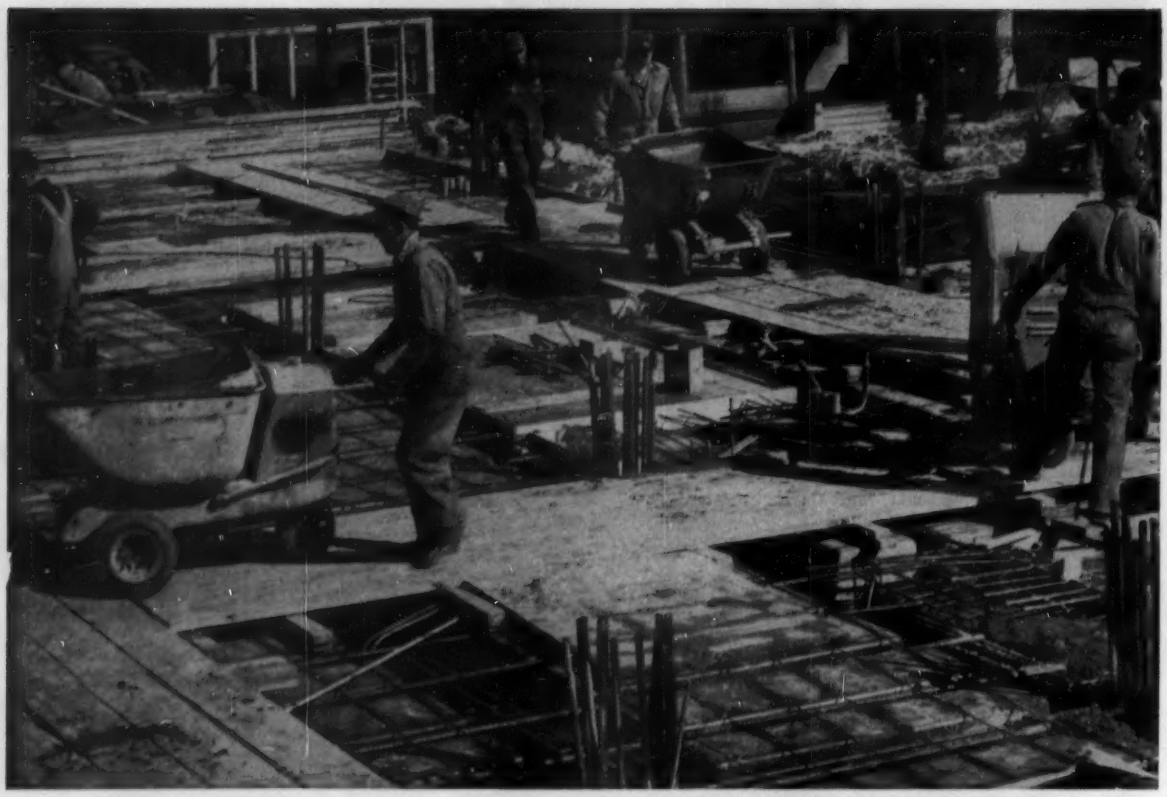


These three PRIME-MOVERS placed over 50 cu. yds. of concrete per hour

# Here is the proven practical way to cut construction costs immediately!

**Contractors switch to labor-saving PRIME-MOVER without complicated job preparation or set-up.**

NOW, many contractors use a PRIME-MOVER when there is concrete to place — bricks to haul — materials to move.

The PRIME-MOVER is narrower than hand buggies and only six inches longer. One man with a PRIME-MOVER will place 12 to 17 cu. yds. of concrete per hour, or haul up to 300 brick per trip.

PRIME-MOVER has a dump bucket and a flatbed that interchange in seconds without tools. Powered by a dependable engine. The transmission requires a minimum of maintenance. PRIME-MOVER is stocked, serviced, and sold by leading distributors throughout the United States and Canada.

Write for job information and estimators performance data — and literature on the newest PRIME-MOVER, the Model 15A.

PRIME-MOVER pouring concrete from bucket

PRIME-MOVER hauling tile on flatbed

**PRIME-MOVER**

THE PRIME-MOVER CO., MUSCATINE, IOWA

## ASSEMBLE PIPE FIRST...
**Continued**

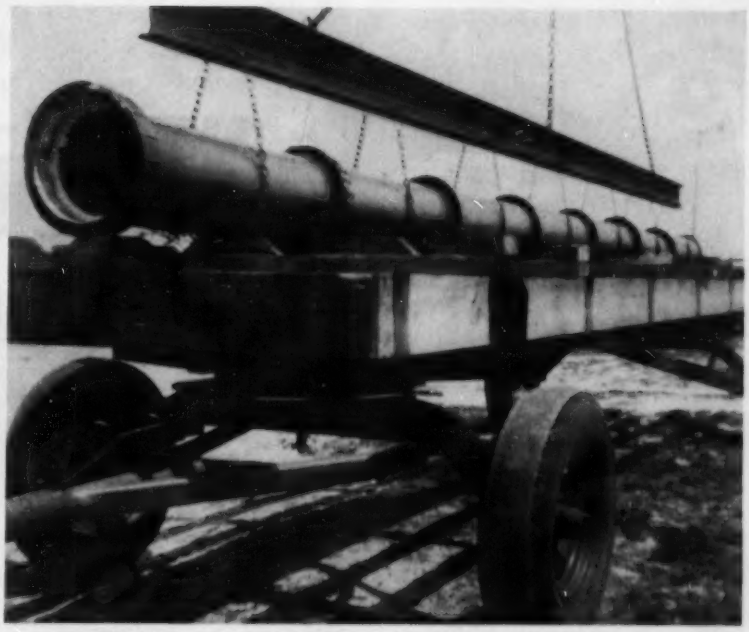
it, and make a hot-poured joint.

Three of these two-length sections then are placed on templates erected near the installation site and the pre-formed bituminous joints "shoved home" to form an 18-ft length. A seventh section completes the 21-ft length.

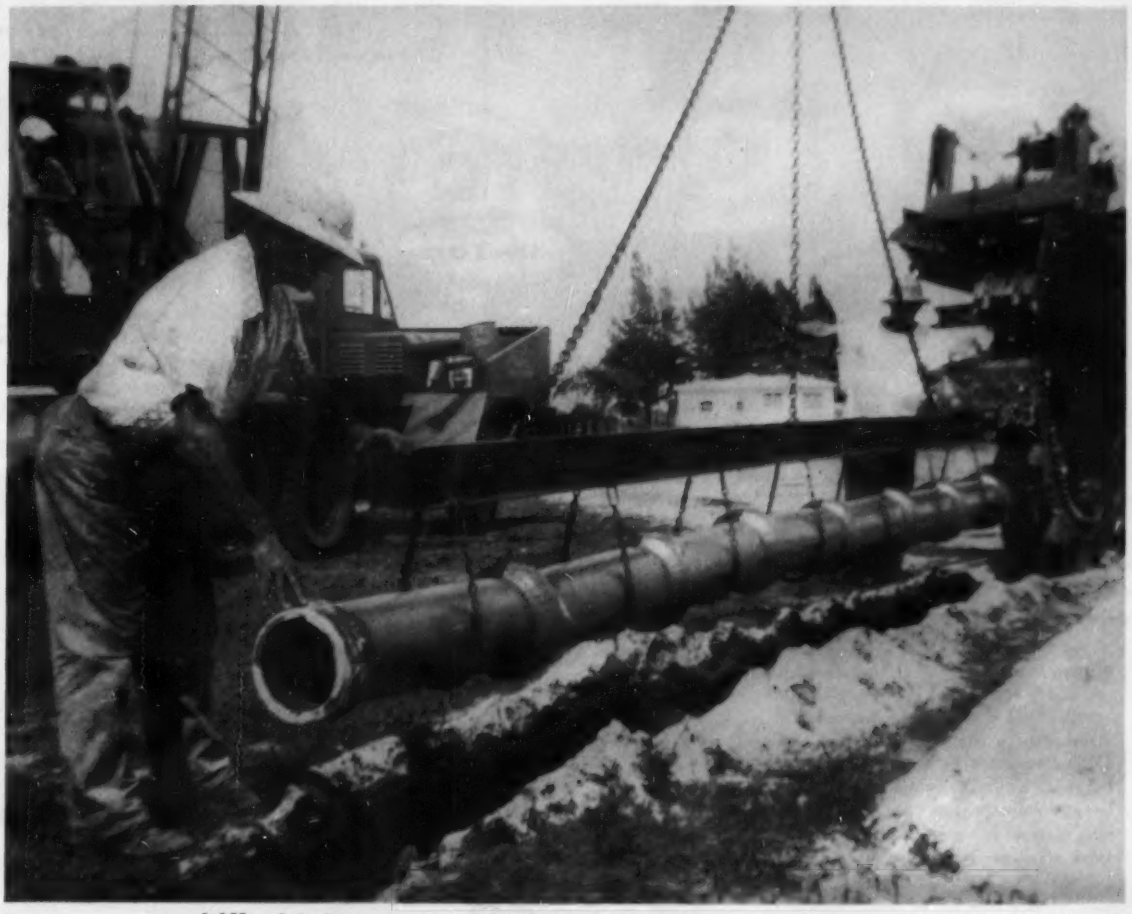
Gaines says two men can pre-assemble 2,000 ft of pipe into seven-length sections in an 8-hr day with this method.

The 21-ft lengths are moved to installation sites on trains of three standard farm wagons. Pipe loss is insignificant—less than a single length in 2,500 ft. In the trench, one assembly is simply pushed home into the assembly previously laid. Pre-formed joints at the ends make these connections easy.

Architect and engineer for Carol City is Gilbert W. Clifford of Miami Springs. Superintendent for Gaines is D. M. Capps.



**LOAD ON WAGONS** Chains attached to an I-beam help crane lift pipe onto a notched rack on wagons. Ordinary farm wagons move the 21-ft lengths.



**LAY IN TRENCH** Only three men are needed at the trench. Two men guide the pipe into place, and the third operates the crane. Despite a high water table, infiltration averages only one-third the permissible amount

# 5 "Euc" REAR-DUMPS

## 10-Ton

The Model UD has a 6½ cu. yd. body and rated payload of 20,000 lbs.—a quarry body with flared sides is available for rock work. Designed for smaller mine, quarry and construction work, this Rear-Dump has a 128 h.p. engine and 10-speed transmission providing a top speed of 36 m.p.h. Drive axle is spring mounted—tires are 11.00 x 24 front with 12.00 x 24 rear duals.

## 15-Ton

There are two models of this capacity "Euc". One has a 10 cu. yd. body, 165 h.p. engine, semi-rigid drive axle and manual steering—the other has a 218 h.p. engine, 10½ yd. body, spring mounted drive axle and hydraulic steering. The latter model can be equipped with larger tires to increase the rated payload to 18 tons. Both have 5 speed transmissions and 14.00 x 24 tires standard—a quarry body for either model is available.

## 22-Ton

Practically a "standard" on larger quarry, mine and heavy construction projects, the Model TD "Euc" has a 300 h.p. engine, spring mounted drive axle, and 15 yd. body. Tires are 14.00 x 24 front with 18.00 x 25 duals rear. Hydraulic steering is standard, and a quarry body is available. This "Euc" can be equipped with a 10-speed transmission or Torqmatic Drive—it's a top performer on the toughest jobs.

**EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio**

# 10 to 50 TONS—128 h.p. to 600 h.p.

## A Complete Line of Off-highway Haulers

**34-Ton**

This Twin-Power tandem axle "Euc" has two engines providing a total of 400 or 436 h.p.—each engine drives an axle through a separate Torqmatic Drive. The exhaust heated body has a capacity of 24 yds. Tires are 16.00 x 25 front, with 16.00 x 25 rear duals in tandem. For jobs where large loading equipment is used and big loads must be hauled, the Model FFD has no equal for low cost production and performance.

*for*

## CONSTRUCTION, MINE, QUARRY and INDUSTRIAL WORK

Rear-Dump "Eucs" are the outstanding choice for moving heavy excavation on the toughest jobs because they are built exclusively for off-the-highway service. They have the capacity, power and speed to haul big loads faster and at lower cost per ton or yard moved.

The simple, rugged construction of Euclid Rear-Dumps pays off in long life and low maintenance cost. There's less down time for repairs . . . more work-ability. These "Eucs" have engines of 128 to 600 total h.p. . . . single and tandem drive axles . . . standard or quarry type bodies . . . gear transmissions and Torqmatic Drive . . . spring mounted and semi-rigid drive axles . . . top speeds, with full payload, up to 36 m.p.h.

Wherever you see Rear-Dumps in off-highway work, it's almost a sure thing they are "Eucs" because Euclid has been the leader in this field for over 20 years. There are more Rear-Dump "Eucs" in service than all other makes of off-highway haulers combined. Have your Euclid dealer supply helpful data on this complete line of Rear-Dumps and other Euclid earth moving equipment . . . you may find, as hundreds of owners already have found, that ***Euclids are your best investment.***

**50-Ton**

Largest Rear-Dump hauler in standard production, the Model LLD Euclid is designed for the biggest, toughest jobs. It has two engines, providing a total of 600 h.p.—each of the spring mounted drive axles is driven through separate Torqmatic Drives. The exhaust heated body has a 32 yd. capacity. All tires are 18.00 x 33. Twin Euclid hoists have ample power to raise the fully loaded body fast for quick, clean dumping.

**Rear-Dump "Eucs" are your best bet**

# Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

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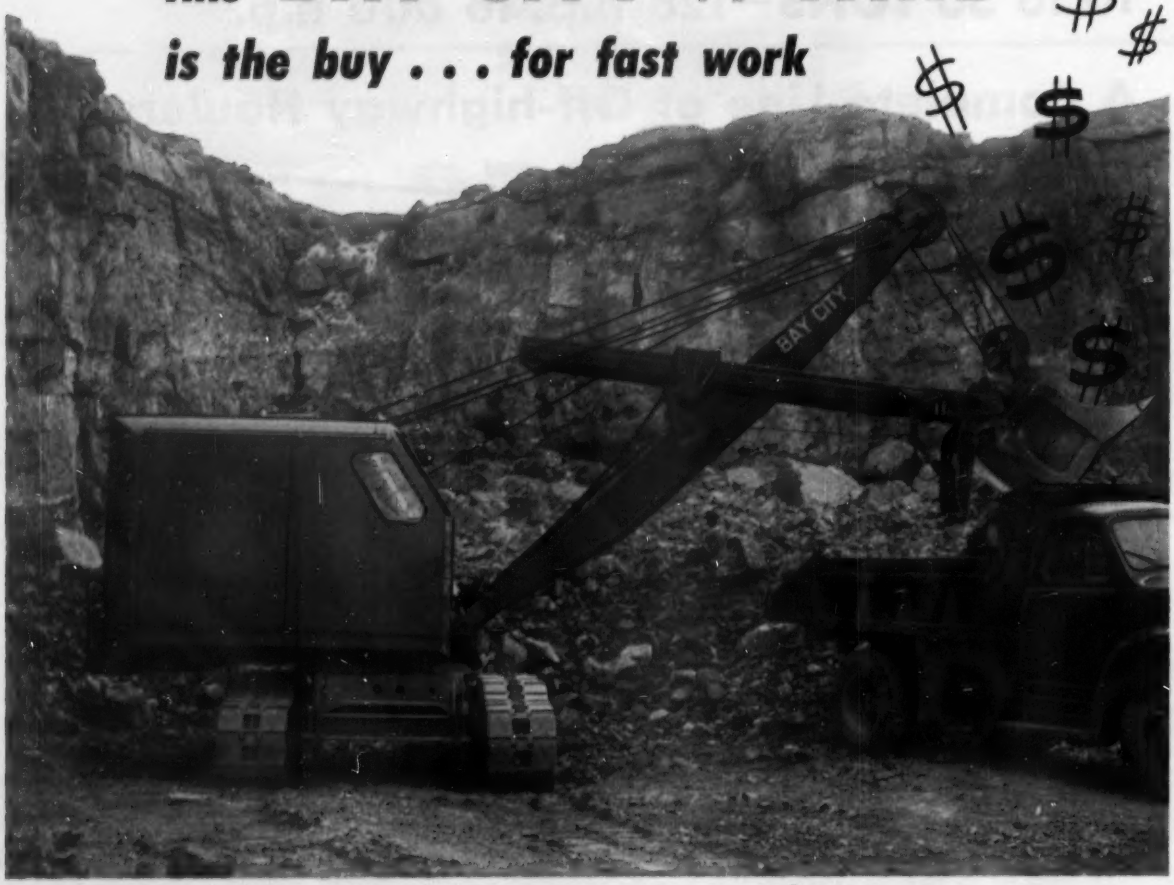
# this BAY CITY ¾ YARD
# is the buy . . . for fast work



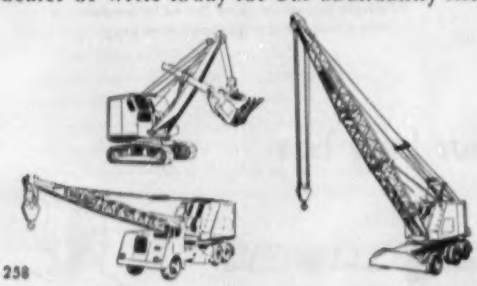

Want performance in a shovel? Then get a BAY CITY ¾ YARD. Its snappy swing, quick, responsive controls, fine balance and powerful engine provide a fast digging cycle. That means dollars to you in the field.

And the rugged, heavy duty construction of this BAY CITY machine means less down time for repairs and lower all-round maintenance costs. More dollar savings to you in the shop.

Fully convertible and equally efficient as a shovel, hoe, dragline or clamshell. Get the complete facts from your nearest BAY CITY dealer or write today for our abundantly illustrated catalog.

**Quick Facts About The BAY CITY ¾ YARD**

- Fully Convertible
- Long, Wide Crawlers
- Alloy Cast Bases
- Tandem Drums
- Power Booster Clutches
- High Line Speeds
- Wide Vision Cab
- Worm Boom Hoist



258

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## Do's and Don'ts of...

# Explosives Handling

All explosives are dangerous. Only careful planning and strict observance of safe practices can prevent accidents. Mishandling by an incompetent user can kill or injure both workers and bystanders.

To keep the construction industry alert to the dangers, the Institute of Makers of Explosives recently revised its list of suggestions for avoiding the more common causes of accidents. While it does not cover every conceivable type of hazard, it provides an excellent background for both the professional and the prospective user. It reminds him of the powerful force he directs and warns him of specific dangers when transporting, storing, using, drilling, loading, tamping, shooting, and disposing explosives.

LEG WIRES of blasting cap are secured to prevent cap from pulling away from Atlas cartridge when lowered into hole.

### When transporting explosives . . .

1. **DO** obey all federal, state, and local laws and regulations.
2. **DO** see that any vehicle used to transport explosives is in proper working condition and equipped with a tight wooden or non-sparking metal floor with sides and ends high enough to prevent the explosives from falling off. The load in an open-bodied truck should be covered with a waterproof and fire-resistant tarpaulin. Wiring should be fully insulated so as to prevent short circuiting, and at least two fire extinguishers should be carried. The truck should be plainly marked so as to give adequate warning to the public of the nature of the cargo.
3. **DON'T** permit metal, except approved metal truck bodies, to contact cases of explosives. Metal, flammable, or corrosive substances should not be transported with explosives.
4. **DON'T** allow smoking or unauthorized or unnecessary persons in the vehicle.
5. **DO** load and unload explosives carefully.
6. **DO** see that other explosives are separated from blasting caps and/or electric blasting caps where it is permitted to transport them in the same vehicle.

### When storing explosives . . .

7. **DO** store explosives in accordance with federal, state, or local laws and regulations.
8. **DO** store explosives only in a magazine which is clean, dry, well ventilated, reasonably cool, properly located, substantially constructed, bullet and fire resistant, and securely locked.
9. **DON'T** store blasting caps, electric blasting caps, or primers in the same box, container, or magazine with other explosives.
10. **DON'T** store explosives, fuse, or fuse lighters in a wet or damp place, or near oil, gasoline, cleaning solutions or solvents, or near radiators, steam pipes, stoves, or other sources of heat.
11. **DON'T** store any sparking metal, or sparking metal tools in an explosives magazine.
12. **DON'T** smoke or have matches, open lights, or other fire or flame in or near an explosives magazine.
13. **DON'T** allow leaves, grass, brush, or debris to accumulate within 25 ft of an explosives magazine.
14. **DON'T** shoot into explosives or allow the discharge of firearms in the vicinity of an explosives magazine.
15. **DO** consult the manufacturer if nitroglycerin from deteriorated explosives has leaked onto the floor of a magazine. The floor should be desensitized by washing thoroughly with an agent approved for that purpose.

### When using explosives . . .

16. **DON'T** use sparking metal tools to open kegs or wooden cases of explosives. Metallic slitters may be used for opening fiberboard cases, provided that the metallic slitter does not come in contact

● Here's a catalog with money-saving tool ideas—the NEW MALL Construction Tool Catalog.

It contains hundreds of on-the-job ideas, new tool uses and applications that can save you both time and money. You will also see one of the most complete portable power tool lines manufactured.

Whenever the need for high quality, time saving construction tools arise, select MALL. Get your new MALL Construction Tool Catalog now—it's FREE and it's Valuable.

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CU-356

LOWERING PRIME CARTRIDGE into hole. At least one more cartridge should be lowered atop primer before any are dropped. Don't force cartridges past obstructions.

with the metallic fasteners of the case.

17. **DON'T** smoke or have matches, open lights, or other fire or flame nearby while handling or using explosives.
18. **DON'T** place explosives where they may be exposed to flame, excessive heat, sparks, or impact.
19. **DO** replace or close the cover of explosives cases or packages after using.
20. **DON'T** carry explosives in the pockets of your clothing or elsewhere on your person.
21. **DON'T** make up primers in a magazine, or near excessive quantities of explosives, or in excess of immediate needs.
22. **DON'T** insert anything but fuse in the open end of a blasting cap.
23. **DON'T** strike, tamper with, or attempt to remove or investigate the contents of a blasting cap or an electric blasting cap, or try to pull the wires out of an electric blasting cap.
24. **DON'T** allow children or unauthorized or unnecessary persons to be present where explosives are being handled or used.
25. **DON'T** handle, use, or be near explosives during the approach or progress of any electrical storm. All persons should retire to a place of safety.
26. **DON'T** use explosives or blasting equipment that are obviously deteriorated or damaged.
27. **DON'T** attempt to reclaim or use fuse, blasting caps, electric blasting caps, or any other explosives that have been water soaked, even if they have dried out. Consult the manufacturer.

### When drilling and loading . . .

28. **DO** carefully examine the face or rock before drilling to determine the possible presence of unfired explosives. Never drill into explosives.
29. **DO** check the bore hole carefully with a wooden tamping pole or measuring tape to determine its condition before loading.
30. **DON'T** stack surplus explosives near working areas during loading.
31. **DO** cut from a spool the line of detonating fuse extending into a bore hole before loading the remainder of the charge.
32. **DON'T** load a bore hole with explosives after springing (enlarging the hole with explosives) or upon completion of drilling without making certain that it is cool and that it does not contain any hot metal, or burning or smoldering material. Temperatures in excess of 150° F. are dangerous.
33. **DON'T** spring a bore hole near another hole loaded with explosives.
34. **DON'T** force cartridges or any explosives into a bore hole or past any obstruction in a bore hole.
35. **DON'T** force a blasting cap or an electric blasting cap into dynamite. Insert the cap into a hole made with a punch designed for the purpose.
36. **DON'T** slit, drop, deform, or abuse the primer.
37. **DON'T** connect blasting caps, or electric blasting caps to detonating fuse except by methods recommended by the manufacturer.

*(Continued on page 183)*

# CLIPPER *Sells* MORE... *Because* CLIPPER *Sells* QUALITY!

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**CONCRETE SAWS**

**Call Us For A FREE Demonstration By A Clipper Factory-Trained Representative**

## 25 H. P. *Self-Propelled*

### • Cut MORE Concrete at LOWER Cost!

Clipper's SIMPLE design... RUGGED construction... DEPENDABLE performance give you a fast powerful Concrete Saw for heavy production cutting on all concrete and asphalt jobs. EXCLUSIVE Clipper features include SELF-PROPELLED unit with ABRASIVE COATED DRIVE WHEELS and rear wheel drive for powerful forward thrust. POSITIVE SCREW FEED—a "Must" when using low-cost "Green-Con" Abrasive Blades to compensate for diminishing blade diameters. Protects valuable diamond blades from bumping and scraping. A Positive Control AT ALL TIMES!

MODEL
**C-250**

25 H. P. Gasoline Powered. Gasoline or Electric Models available from 1½ to 36 H.P.

**CLIPPER BLADES for EVERY JOB**

Use Genuine CLIPPER DIAMOND Blades for Cutting Cured or Green concrete and asphalt with any aggregate. CLIPPER "GREEN-CON" Abrasive Blades for cutting "green" Concrete. There is a Clipper Blade for ALL Your Jobs.

***Ask for* FREE DEMONSTRATION TRIAL on *Your* Job!**

## *USE GENUINE CLIPPER BLADES*—Diamond & Green-Con Abrasive

DIAMOND BLADES for any job—any aggregate—every saw! Choose your Clipper Diamond Blade from a wide variety of specifications to cut green or old concrete with outstanding speed and economy.

GREEN-CON ABRASIVE BLADES give you savings as high as 80%—with completely new series of "Green-Con" Reinforced Abrasive Blades that cut "Green concrete" with the widest possible range of HARD to SOFT Limestone Aggregates.

Clipper® KANSAS CITY, MO.

Better Mail the Coupon NOW!

• Genuine Clipper Products are Sold Only Direct, from Factory Branches in Principal Cities, Coast to Coast. Consult Your Phone Book, or Mail Coupon for Same-Day Service.

**CLIPPER MANUFACTURING CO.**
**2809 S. Warwick • Kansas City 8, Mo.** 425X

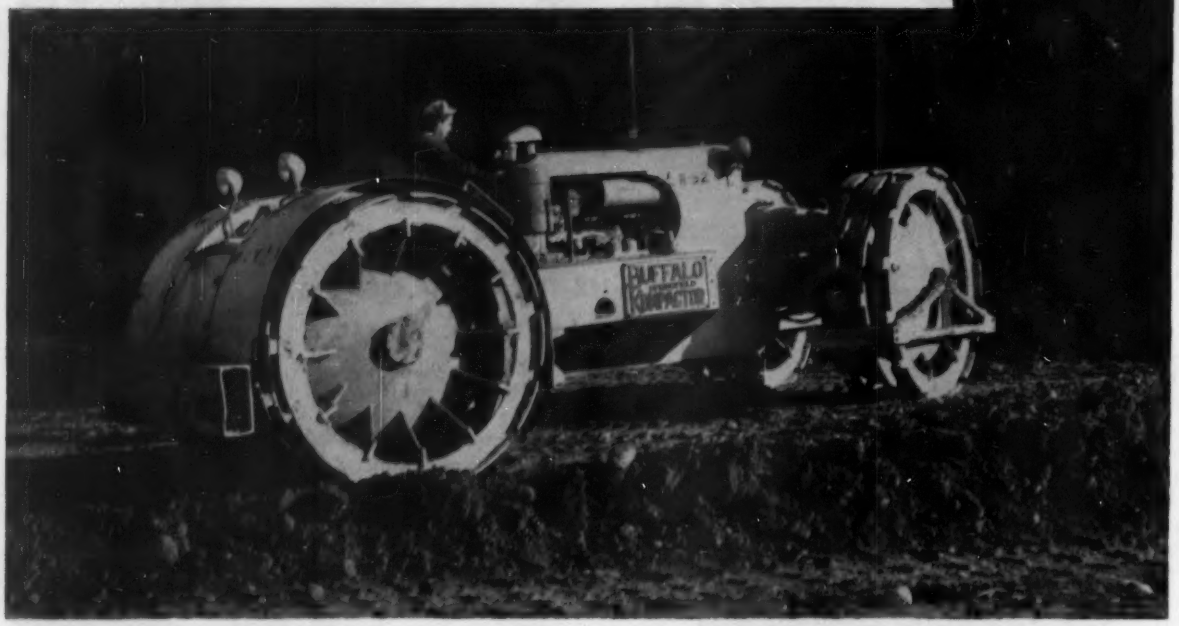
- ☐ I want a FREE DEMONSTRATION of a Clipper Concrete Saw
- ☐ Send FREE literature on Clipper Masonry Saws and Blades
- ☐ Send FREE literature on Clipper Concrete Saws and Blades
- ☐ Have a Clipper factory trained representative call on me.

NAME_____

ADDRESS_____

CITY_____ STATE_____

## *How . . . Langenfelder & Son's K-45 Kompactor*




# is cutting time and compaction costs

## *. . . on one of the toughest sections of the Massachusetts Turnpike*

C. J. Langenfelder & Son., Inc. of Baltimore (owner of three Buffalo-Springfield K-45 Kompactors) has the largest single contract, money-wise, on the eastern half of the Massachusetts Turnpike, and the second largest on the entire 123 mile project. Their 5.37 mile section includes 17 bridges and the big Auburn Interchange.

Langenfelder's problem of proper compaction in the shortest time at lowest cost on this project is solved by the Buffalo-Springfield K-45 Kompactor.

The self-propelled highly maneuverable K-45 gives the highest degree of compaction with fewest passes. Its "Interrupted Pressure Principle" directs all compaction effort downward —the pads enter loose material with minimum displacement. Normal compaction time and costs are drastically reduced. It leaves a smooth finished surface that prevents moisture from penetrating the material after rolling is finished. And, the K-45 works *close* to bridge abutments, eliminates 90% of the hand tamping.

Every way you figure it, the K-45 Kompactor saves time, meets density requirements and cuts costs. Check today with your Buffalo-Springfield distributor for full facts . . . and send for the latest K-45 Kompactor bulletin No. S-67-455.

**BUFFALO ROLLER COMPANY** **SPRINGFIELD** SPRINGFIELD, OHIO, U. S. A.

THE LEADER IN COMPACTION EQUIPMENT DESIGN AND MANUFACTURE

## EXPLOSIVES HANDLING . . .
**Continued**

**When tamping . . .**

38. **DON'T** tamp dynamite that has been removed from the cartridge.
39. **DON'T** tamp with metallic devices of any kind. Use wood tamping tools with no exposed metal parts except non-sparking metal connectors for jointed poles. Avoid violent tamping. Never tamp the primer.
40. **DO** confine the explosives in the bore hole with sand, earth, clay, or other suitable incombustible stemming material.
41. **DON'T** kink or injure fuse, or electric blasting cap wires, when tamping.

**When shooting electrically . . .**

42. **DON'T** uncoil the wires or use electric blasting caps during dust storms or near any other source of large charges of static electricity.
43. **DON'T** uncoil the wires or use electric blasting caps in the vicinity of radio-frequency transmitters except at safe distances. Consult the manufacturer or the Institute of Makers of Explosives pamphlet on "Radio Frequency Hazards."
44. **DO** keep the firing circuit completely insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray currents.
45. **DON'T** have electric wires or cables of any kind near electric blasting caps or other explosives except at the time and for the purpose of firing the blast.
46. **DO** test all electric blasting caps, either singly or when connected in a circuit, using only a blasting galvanometer specifically designed for the purpose.
47. **DON'T** use in the same circuit either electric blasting caps made by more than one manufacturer, or electric blasting caps of different style or function even if made by the same manufacturer, unless such use is approved by the manufacturer.
48. **DON'T** attempt to fire a circuit of electric blasting caps with less than the minimum current specified by the manufacturer.
49. **DO** be sure that all wire ends are bright and clean.
50. **DO** keep the electric cap wires or leading wires short circuited until ready to fire.

**When shooting with fuse . . .**

51. **DO** handle fuse carefully to avoid damaging the covering. In

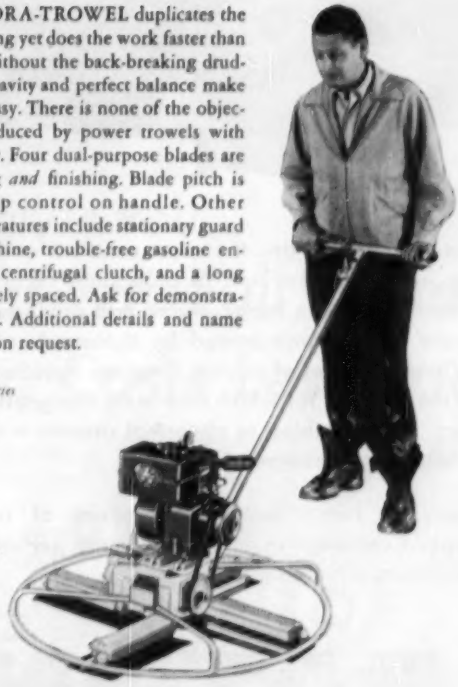
The NEW Kelley

HYDRA-TROWEL

(PATENTS PENDING)

The new Kelley HYDRA-TROWEL duplicates the quality of hand-finishing yet does the work faster than hand-troweling and without the back-breaking drudgery. Low center of gravity and perfect balance make operation amazingly easy. There is none of the objectionable gyrating produced by power trowels with high centers of gravity. Four dual-purpose blades are used for both floating *and* finishing. Blade pitch is adjusted by finger-tip control on handle. Other HYDRA-TROWEL features include stationary guard ring for carrying machine, trouble-free gasoline engine with heavy-duty centrifugal clutch, and a long handle with grips widely spaced. Ask for demonstration and be convinced. Additional details and name of nearest distributor on request.

*A few good distributor territories still available.*



Kelley also makes the Kelley Compactor for
- Floating dry-mix topping
- Driving in surface hardeners
- Grinding out surface imperfections.

Kelley MACHINE DIVISION
WIESNER-RAPP CO., INC.
285 HINMAN AVE., BUFFALO 23, N. Y.

# EATON *TANDEM DRIVE* AXLES

## Give Trucks Greater Load Capacity— Reduce Tire and Operating Costs

Eaton Tandems are the most practical units available for increasing payload in proportion to gross weight. Eaton Axles—the load-carrying and driving components —are performance-proved by thousands of units and millions of miles of service. They are installed to operate in the position for which they were designed and, therefore, are not subject to abnormal stresses or to unnatural lubricating problems.

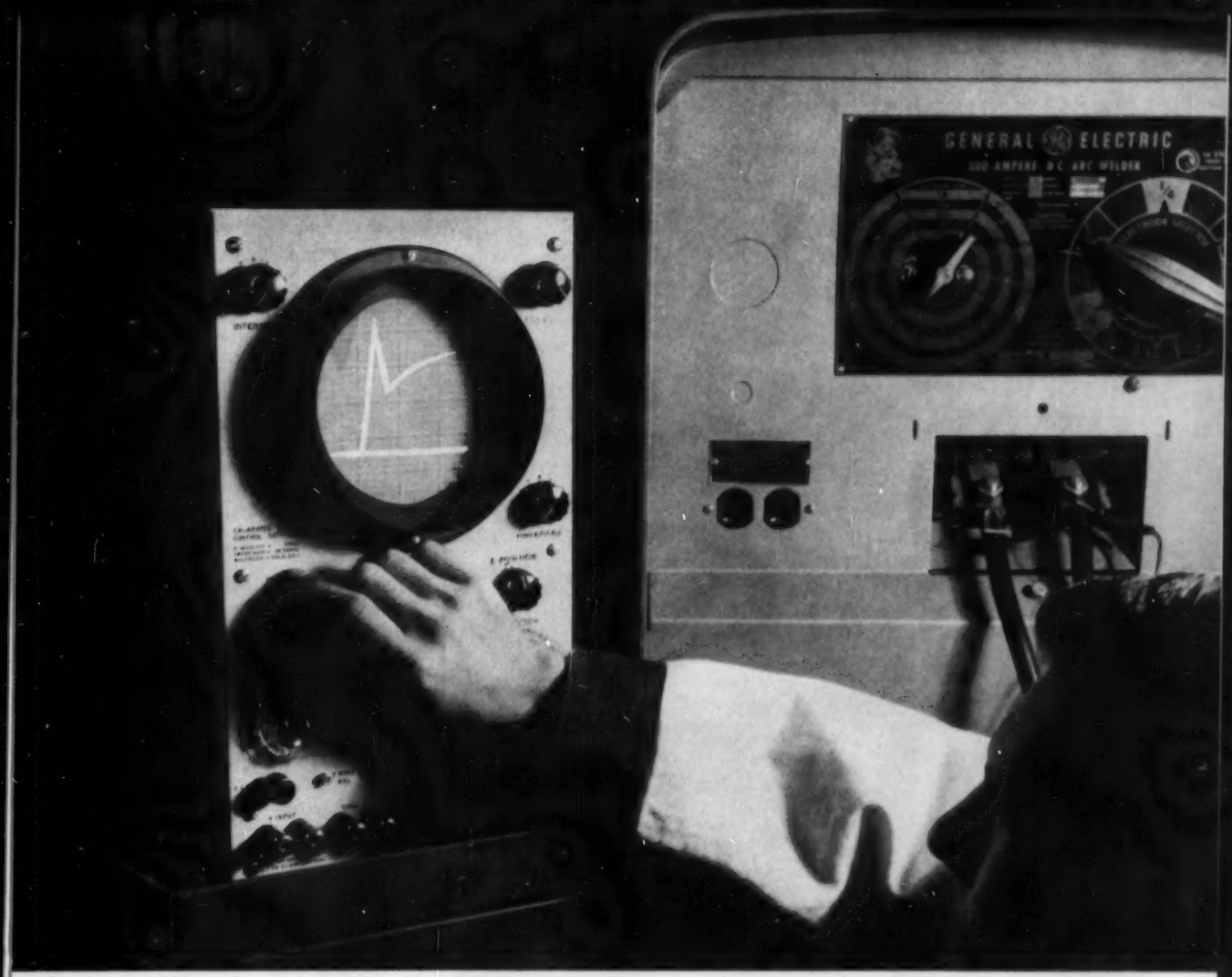
Exclusive Eaton features, simplicity of design, and rugged construction assure maximum performance with minimum maintenance.

### Eaton Tandem Axle Features Provide Superior Performance

- Engineered specifically for tandem operation
- Rugged power divider transmits power equally to both axles
- Inter-axle differential compensates for variation in wheel speed and eliminates the need for tire matching
- Differential lock-out provides positive drive to each axle when needed
- Designed to give maximum strength with minimum weight

**EATON** — *AXLE DIVISION* — MANUFACTURING COMPANY
CLEVELAND, OHIO

**PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



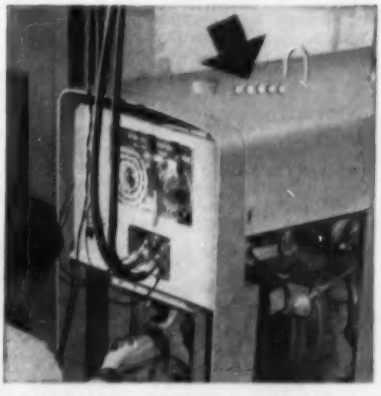

## *G.E.'S NEW ENGINE-DRIVE WELDER GIVES YOU . . .*

# Steady Welding Output—at Full Load; Improves Weld Quality, Costs Less Too

If you're using more than a 200-amp engine-drive welder for light to medium-heavy construction, you may be losing money. You may be paying for inefficiency—compensating for excessive loss of amperage and arc heat when operating at full load for sustained periods.

*Now*, with G.E.'s new 200-amp engine-drive welder, it's not necessary to buy more expensive, higher rated machines for pipeline, light construction, or job-shop work. This field-tested welder gives you steady output and 100% arc stability, hour-after-hour, even when operated *above* full load.

Test this powerful new welder yourself, and see the many advanced design features—new slow-down control, extra-rugged construction, and many others. Contact your nearby G-E Welding Distributor today. He's listed in the yellow pages of your phone book. Section 714-3, General Electric Co., Schenectady 5, New York.



**EXTRA-STURDY** construction is shown in this demonstration. Five nickels stand on edge while welder is operated at full load.

**GENERAL ELECTRIC**

cold weather warm slightly before using to avoid cracking the waterproofing.

52. **DON'T** use short fuse. Never use less than two feet. Know burning speed and make sure you have time to reach a place of safety.

53. **DON'T** cut fuse until you are ready to insert it into a blasting cap. Cut off an inch or two to insure a dry end. Cut fuse squarely across with a clean sharp blade. Seat the fuse lightly against the cap charge and avoid twisting.

54. **DON'T** crimp blasting caps by any means except a cap crimper designed for the purpose. Make certain that the cap is securely crimped to the fuse.

55. **DO** light fuse with a fuse lighter designed for the purpose. If a match is used the fuse should be slit at the end and the match head held in the slit against the powder core. Then scratch the match head with an abrasive surface to light the fuse.

56. **DON'T** light fuse until sufficient stemming has been placed over the explosive to prevent sparks or flying match heads from coming into contact with the explosive.

57. **DON'T** hold explosives in the hands when lighting fuse.

### In underground work . . .

58. **DO** use permissible explosives only in the manner specified by the United States Bureau of Mines.

59. **DON'T** take excessive quantities of explosives into a mine at any one time.

60. **DON'T** use black blasting powder or pellet powder with permissible explosives or other dynamite in the same bore hole in a coal mine.

### Before and after firing . . .

61. **DON'T** fire a blast without a positive signal from the one in charge, who has made certain that all surplus explosives are in a safe place, all persons and vehicles are at a safe distance or under sufficient cover, and that adequate warning has been given.

62. **DON'T** return to the area of any blast until the smoke and fumes from the blast have been dissipated.

63. **DON'T** attempt to investigate a misfire too soon. Follow recognized rules and regulations, or if no rules or regulations are in effect, wait at least one hour.

64. **DON'T** drill, bore, or pick out a charge of explosives that has misfired. Misfires should be handled only by or under the direction of a competent and experienced person.

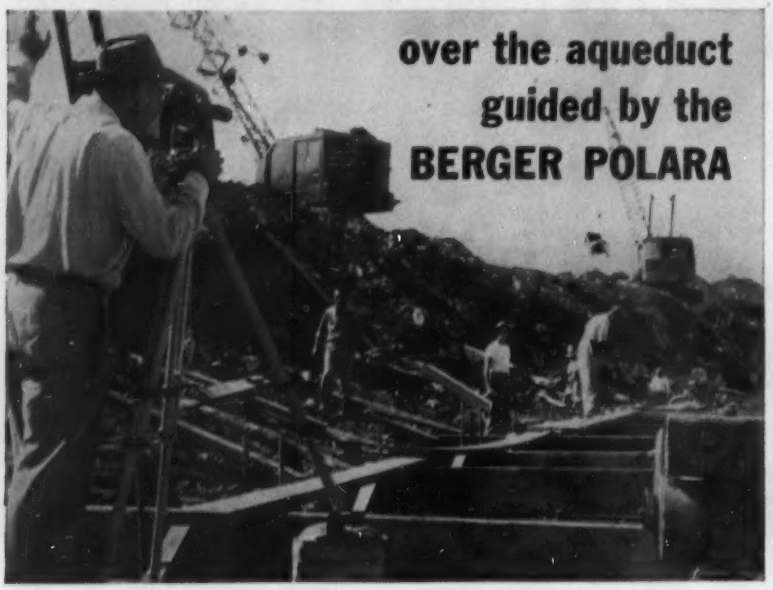
### Explosives disposal . . .

65. **DON'T** abandon any explosives.

66. **DO** dispose of or destroy explosives in strict accordance with approved methods. Consult the manufacturer or follow the Institute of Makers of Explosives pamphlet on destroying explosives.

67. **DON'T** leave explosives, empty cartridges, boxes, liners, or other materials used in the packing of explosives lying around where children or unauthorized persons or livestock can get at them.

68. **DON'T** allow any wood, paper, or fiber materials employed in packing explosives to be burned in a stove, fireplace, or other confined space, or to be used for any purpose. Such materials should be destroyed by burning at an isolated location at doors and no person should be nearer than 100 ft.


**Project: Building protective arch over New York City Aqueduct at Stewart Air Field**

**Contractor: Philsan Contracting Co., New York**

"The moderate price of the Berger Polara first attracted us," says Nathaniel Gartman, Philsan engineer and construction superintendent on the project. "But naturally, price alone would have meant nothing if we weren't convinced that the transit was up to the job."

Philsan had to construct, at Newburgh, N. Y., a protective, reinforced concrete arch over an 885 foot section of the huge aqueduct built to supply New York City with drinking water. Reason: the Air Force at Stewart Field required a new landing strip directly over the aqueduct for its jet fighters.

Here was a job that called for accuracy, to be sure, yet did not demand the ultra precise readings obtainable with Berger's 6¼" Engineers' Transit.

When Philsan engineers saw that Polara's 5½" horizontal circle reads to one minute, with a resolving power of four seconds—they knew they had an instrument that was right for the job—and for many others in the future.

"We used Polara exclusively, from start to finish," Mr. Gartman tells us. "We kept it busy setting grades, laying out the lines and curves. We had more than our share of mud and dust, but nothing seemed to bother the instrument. Optics are exceptionally clear. Cross hairs sharp and distinct. Controls smooth and dependable. Happy we got it."

Put yourself behind a POLARA—as so many contractors are doing. See how this instrument fills your need for an *all-around utility transit at a budget price.* Send for the complete details.

*$522 without compass...$549 with compass, F.O.B. factory.*

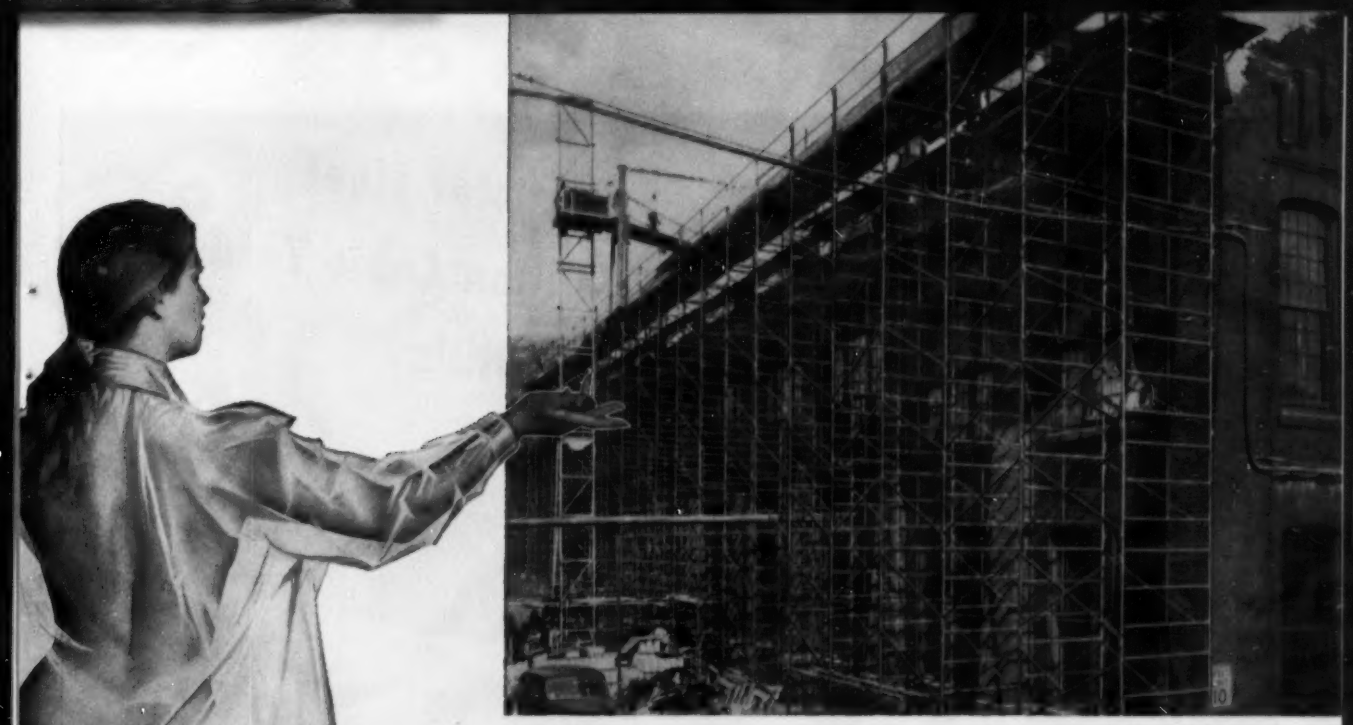
**C. L. Berger & Sons, Inc., 53 Williams St., Boston 19**

Berger 6¼" Engineers' Transit first in engineering, first with engineers.

THE BEST IN SIGHT IS

BERGER

ENGINEERING AND SURVEYING INSTRUMENTS . . . SINCE 1871



# they both have a problem of 'skin protection'

Certainly you'll agree that a woman's sensitive skin needs protection. But did you, as a construction man, ever stop to think how important this matter of skin protection is for your scaffolding?

For instance, if your scaffold is rusted (which is normal unless you spend many costly dollars for maintenance) you'll have a tougher time assembling and dismantling it because of the rough pitted surfaces caused by rust. What's more, rusted scaffolding has shorter life . . . because rust means deterioration.

*If, then, your rusted scaffold erects slower and has shorter work life, isn't it costing you profits?*

The answer lies in the new UNIVERSAL EZEBILT SCAFFOLDING with its *galvanized* protective coating. Now every single part of this quality scaffolding is covered with a lastingly-smooth, lubricative surface of galvanizing – it resists rust, erects faster, lasts longer, and looks better on the job. *At no extra cost,* Universal galvanized answers the most urgent need in the scaffold industry since the no-loose-parts feature of Gravity-Lock. Insist that your scaffold be galvanized – Universal galvanized.

## UNIVERSAL *the only* GALVANIZED SCAFFOLD

**UNIVERSAL MANUFACTURING CORP. • ZELIENOPLE 6, PA.**

*Send for catalog describing the panel types and sizes for all construction, mason, or maintenance applications.*

Local Distributors everywhere with Rental or Sale Stocks of Universal galvanized scaffolding and American-Tubular elevating towers

# Allis-Chalmers Scraper and Tractor Fleet Moves Four and a half Million Cubic Yards of California Hills

Four HD-16 tractors with 20-cu. yd. Allis-Chalmers scrapers level a hill to make a large fill. Torque converter drive helps units return uphill fast for next load . . . cut valuable time from every cycle.

## Motor Scrapers and HD-21's and HD-16's with pull-type scrapers level steep grades on Millbrae housing project near San Francisco

In leveling 50 acres of rugged California hills to complete its Millbrae housing project just south of San Francisco, Trousdale Construction Co. is moving 4½ million cubic yards of earth—with over a million cubic yards to be placed on a single fill.

To handle the job, Trousdale called on Tecon Construction Co. of Dallas, Texas. Tecon called on its fleet of Allis-Chalmers torque converter drive crawler tractors—six HD-21's and six HD-16's. In addition, Tecon brought in a fleet of Allis-Chalmers pull-type and motor scrapers to do the dirt hauling.

On this big project, the HD-21's and HD-16's are overcoming steep grades and stubborn hills. One reason: torque converter drive which makes full use of maximum engine horsepower . . . automatically matches tractor speed and pull to load and terrain conditions . . . provides outstanding operating ease . . . eliminates engine stalling and most shifting, reduces shock and strains to power train.

Allis-Chalmers motor scraper climbs steep grade for another load. Hill in background is just one of many being leveled by Tecon Construction Co.'s fleet.

Output-producing HD-16's put a big load into this scraper. Wide, low bowl design and offset cutting edge help Allis-Chalmers scrapers get heaping, void-free loads . . . cut cost and time per yard.

Never an idle moment for Allis-Chalmers tractors—when not push-loading they are busy dozing. An HD-21, right rear, compacts earth with a sheeps'-foot roller.

Other reasons: Allis-Chalmers diesel engine design causes exploding fuel to exert follow-through push on the pistons . . . provides maximum leverage when crankshaft is at most favorable angle . . . eliminates combustion knock, gives complete, clean combustion and more usable power per drop of fuel.

As the going gets tougher on this job, other HD-21 and HD-16 advanced design features show their superiority: all-steel box-A main frame, 1,000-hr lubrication, straddle-mounted final drives, Tru-Dimension machined and hardened track—all help these big tractors deliver the goods in output, dependability and service simplicity. Let your Allis-Chalmers dealer prove it!

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

# ALLIS-CHALMERS

CRANE LIFTS pint-sized OC-3 to top of building where it begins wrecking job.

LOADER PUSHES over wall section with one easy motion. Same job would require several poundings with a steel ball. Loader's versatility helped it to pay for itself quickly.

# Loader Proves Fast Wrecker

CABLE LOWERS loader to ground after it has finished pushing down tons of rubble. Rig is easily raised or lowered by passing ½-in.-thick cable straps through its crawlers.

A THREE-TON front end loader is proving a speedy and profitable roof-top supplement to the wrecker's ball for a $250,000 demolition of 32 multi-storied buildings in downtown Boston. It is expected to cut the job's estimated 2-yr completion time by six months.

This unorthodox use of the rig was the brainstorm of Frank Wiers, superintendent for Bay-State Wrecking, Inc., under contract to the Massachusetts Department of Public Works to clear away buildings standing in the path of the new John F. Fitzgerald Expressway.

The rig is an Oliver OC-3 tractor fitted with a ½-yd front end, hydraulically operated loader. At work on floors up to eight stories high, it is a thrilling, crowd-gathering sight. Crawling easily over slabs, beams, and naked joists, it pushes over parapet walls, gathers balled rubble, and dumps it to the ground with ease. It also pushes

TRACTOR ADDS another ½-yd load to growing rubble pile. The 3-ton rig built up this pile in little more than an hour.

RUBBLE PILE GROWS so rapidly loader often has to be lowered to ground to help TD-9 tractor load it into waiting dump trucks.

over partitions, sweeps floors clean, and, with a cable attached behind, pulls over walls.

Wiers hadn't planned using the rig at all. He thought he had a conventional steel ball, torch, and jackhammer job. Buildings to be demolished were ordinary five to eight-story masonry and steel structures. But Wiers ran into trouble while trying to ball through the roof of the first building he tackled. The 1,800-lb steel ball bounced. Repeated droppings produced only more bounces. In fact, it required two hours of work to punch one hole through the roof.

"We estimated two years to do the whole job," Wiers said. "But the way the ball was bouncing, it looked like it would take that time just to get through the first building."

Reason for the bouncing was a 3-ft-thick laminated roof slab. The slab was made up of several layers of different materials: 12 in. of terra cotta blocks, 33 in. of cinder concrete, 3 in. of plain concrete, several plys of membrane waterproofing, and a layer of slate tile. The layers acted like a spring.

This kind of trouble hadn't been anticipated. With the ball ineffective, Wiers would have to turn to jackhammers. For such a thick slab, that figured to be both costly and time consuming. The job looked like it would end up in the red.

Wiers looked with troubled eyes at the idle 10-ton International Harvester TD-9 with its empty 1-yd Bucyrus-Erie bucket which he had expected to see busily loading rubble. The loader gave him an idea.

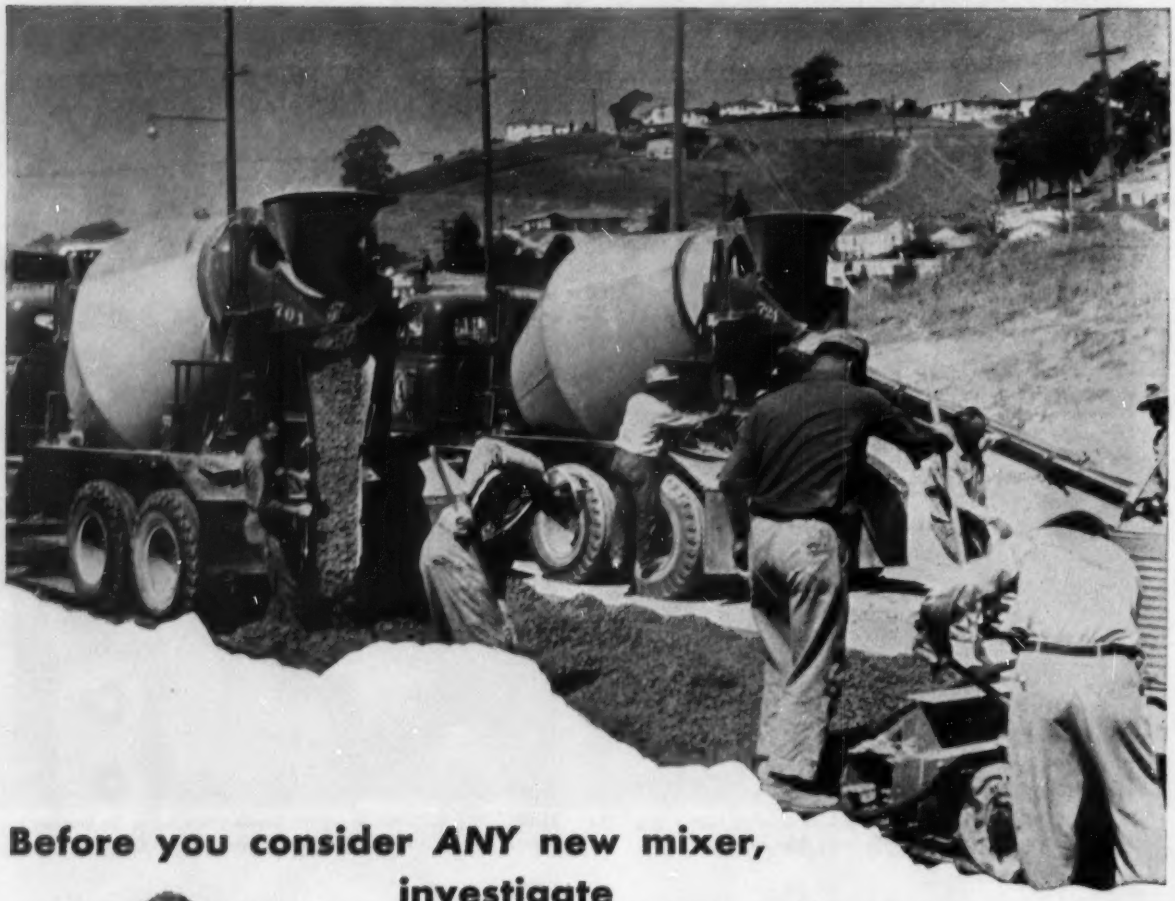
Why not use one—not the big one in front of him, but a smaller one—up on the roof to tear into the different layers of material and dump over the side, leaving the steel ball for wall demolition. He chose Oliver's 3-ton, crawler-mounted OC-3, fitted with a ½-yd front end loader. He bought the rig for $4,600.

The loader arrived on the job, cables were strung through its crawlers, and it was lifted by crane to the roof. And, while several hundred people gathered on the streets below to stare at a tractor working so high, the loader bit into the edge of the balled hole and stripped off cinders, concrete, and terra cotta slabs layer by layer. It dumped the rubble over the parapet walls to the ground where the TD-9 picked it up and loaded it into dump trucks for removal.

It worked so well on the thick roof that Wiers decided to use it on remaining floors, which averaged 28 in. thick. He found he had an excellent tool. The loader didn't touch ground again until the building was totally demolished six weeks later. Loader and rubble pile reached the third story level simultaneously. "We had to move the rubble pile before the loader could continue demolishing," Wiers said.

When the first building was down, the loader went to work on the 31 remaining buildings. While the ball knocks in the wall, the loader picks up the rubble and dumps it over the side. If not busy there, it pushes over partitions, picks up the pieces and dumps them over the side. It sweeps floors clean of debris so that rippers can tear up floor boards for the loader to dump over the side.

Its crawlers ride easily over exposed joists, doing any final pushing or trimming required.



**Before you consider *ANY* new mixer, investigate the revolutionary new**

SMITH

# integral*

ONE FRAME FOR BOTH TRUCK AND MIXER

ONE ENGINE FOR BOTH

Because of its proved, practical features, the new Smith INTEGRAL is providing the ready-mix industry with an entirely new set of standards and advantages.

*You have ONE frame for both truck and mixer.*

*You use ONE engine for both.*

Power is taken off the truck engine ahead of the clutch. The mixer continues to run regardless of clutching or gear shifting. You can select most standard trucks for the Smith INTEGRAL, and forget about the former costly "fight" between mixer frame and truck frame.

This composite of a mixer and a standard truck results in significant savings. Write for details.

*Trademark

**THE T. L. SMITH COMPANY, 2835 North 32nd Street, Milwaukee 45, Wis.**

Affiliated with Essick Manufacturing Company, Los Angeles, California

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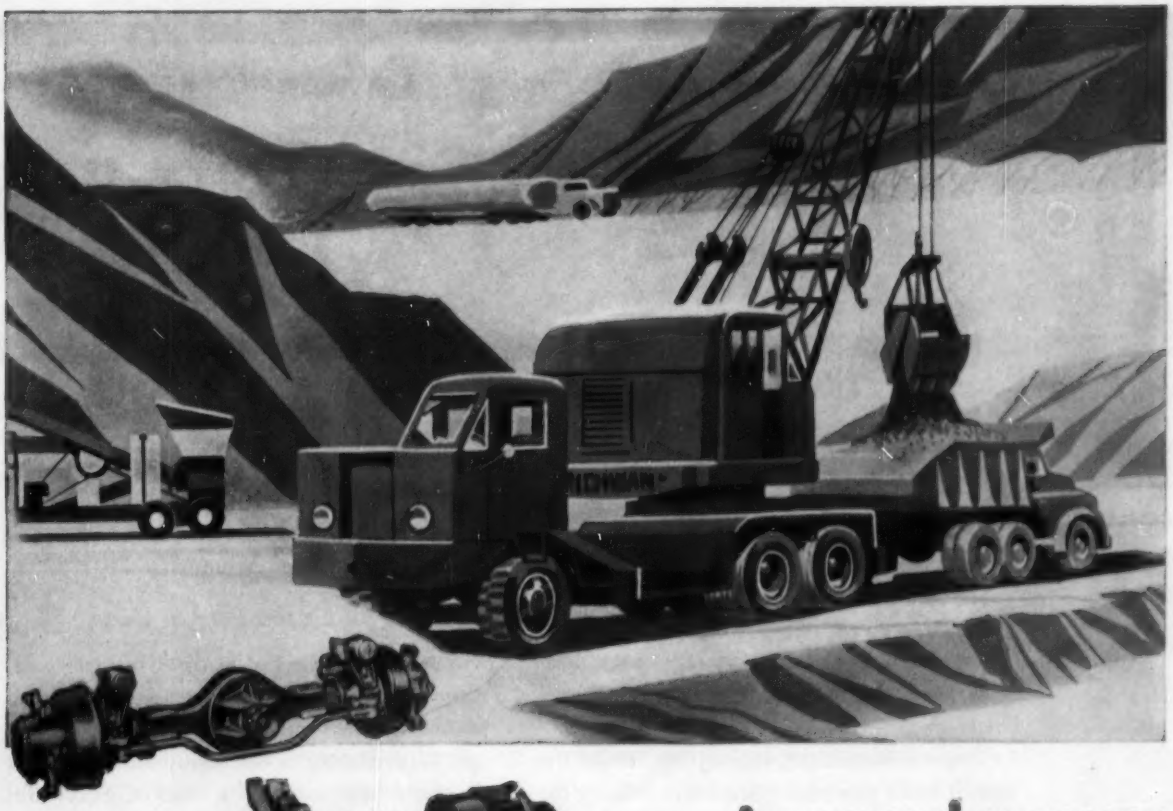

# A rugged answer to *any* tough 6-WHEEL DRIVE problem

Here's a reliable guarantee of a long, useful, profitable life for a hard-working 6 x 6 vehicle—this husky combination:

- **a Clark steering-drive axle for the front**
- **two Clark non-steer drive axles in tandem at the rear**

These are true heavy-duty units—amply strong to carry tremendous loads, ruggedly built to deliver torque to the wheels with dependable efficiency.

Always, wherever you find it, this is a "Quality Specification" . . . CLARK AXLES.

Are you constantly studying how to increase efficiency and decrease costs in that vital area between fly-wheel and tires? Talk to Clark: for in that "vital area" is where Clark can help you; a fact well known to a number of leading equipment manufacturers—to their profit.

**CLARK® EQUIPMENT**

As a practical Step 1, send for the handy, pocket-size Clark Products book—for a clear idea of why it's "good business to do business with Clark."

**CLARK EQUIPMENT COMPANY, Buchanan, Michigan**

OTHER PRODUCTS OF THE CLARK AUTOMOTIVE DIVISION—
TRANSMISSIONS • AXLE HOUSINGS • TRACTOR UNITS • TORCON TORQUE CONVERTERS
ELECTRIC STEEL CASTINGS • GEARS and FORGINGS • FRONT and REAR AXLES for TRUCKS, BUSES and OFF-HIGHWAY EQUIPMENT.

# The Year Advertising Helped

IN 1954 we had a business recession in the United States. Sales fell about 4% during the year. If management had followed the historic pattern of business ups and downs, advertising volume would have fallen much further.

*But in 1954 the volume of advertising did not fall. It increased over 5%. Every effort was made to stimulate sales when sales were needed to sustain prosperity.*

This was something entirely new under the sun. It had a powerful influence in making the recession of 1953-54 one of the mildest on record. It helped greatly to speed business on to the record-breaking levels it has attained today.

There are several reasons why America's business management attacked this decline in sales with more advertising. One of them grew out of the greatly strengthened position of the American consuming market. Consumers' income after taxes has been rising an average of over $10 billion a year since 1946, and this rising income is more widely distributed than ever before. Furthermore, consumers have piled up reserves of about $215 billion in cash or its equivalent. These reserves offer a new and powerful inducement to increased selling and advertising effort even in the face of a possible decline in consumer income.

### *Taking the Longer View*

However, the principal reason why a sales decline was attacked with increased advertising is management's new-found conviction that good advertising is essentially an investment in the development of a market. Successful development requires sustained investment. The inclination of business management to take this longer view, is, of course, motivated by the fact that the American market, with over 3 million consumers being added annually, is growing at a prodigious rate.

Ten years ago only a handful of companies had plans for investment in new producing facilities extending beyond the current year. Today almost all leading companies have investment programs running some years ahead. And keeping pace with these long-range business investment plans has been the development of sales and advertising programs to


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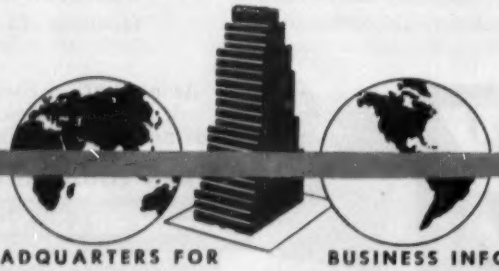

HEADQUARTERS FOR BUSINESS INFORMATION

# Kill a Business Recession

reach tomorrow's greatly expanded markets.

This crucial role of advertising in providing driving power for our economy is gaining greater recognition every day. In his recent book, "People of Plenty," Professor David M. Potter of Yale University remarked: "Advertising is not badly needed in an economy of scarcity, because total demand is usually equal to or in excess of total supply, and every producer can normally sell as much as he produces. It is when potential supply outstrips demand—that is, when abundance prevails—that advertising begins to fulfill a really essential economic function."

### *Advertising's Key Role*

Today abundance so completely prevails in the United States that it has been conservatively estimated that as much as a third of everything offered for sale falls in the realm of "optional consumption." That is, consumers can "take it or leave it" without any immediate personal inconvenience. But if they decide to "leave it," a terrific economic depression will not be far behind. In such circumstances, advertising—in which, in all of its forms, we are now investing about $9.2 billion annually—clearly is of crucial importance to our continued prosperity.

In performing its key role in past years, American advertising never realized its full potential. It successfully promoted sales. But it never was called upon to promote an overall economic stability as a direct outgrowth of increased sales.

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## "We dig between 175 and 200 basements a year, so I sure like this new 2¼-yd Allis-Chalmers HD-11G.

# It handles just like a kitten"

**George Pfeiffer, *Crystal Lake, Illinois***

*Excavating basements, loading out trucks and landscaping work keep George Pfeiffer busy the year 'round. Like all contractors, big or small, he tries to make every hour count.*

*"I like everything about our 11G, including its over-all speed and reach. We can heap big truck loads fast and easy.*

*"When we bought this Allis-Chalmers HD-11G, we didn't figure on using it in close around homes, but we've found that it handles just like a kitten. It responds so quickly that we're using it just like our 1-yd Allis-Chalmers tractor shovel."*

• • •

To get high production on fast-moving job assignments, at a profit, more and more contractors are choosing the new HD-11G. It's a truly modern tractor shovel, with all the advantages of Allis-Chalmers advanced basic design, including an all-steel box-A main frame; one-piece steering clutch and final drive assembly; 24-volt direct electric starting; unit construction; and 1,000-hour lubrication intervals for truck wheels, support rollers and final drives.

What's more, the HD-11G has what it takes for big, tough jobs — 105 net engine horsepower; 2¼-yd bucket capacity; 11-ft, 7-in. dumping height; 32,000 lb of balanced weight; almost 9 ft of track on the ground; 8 heavy-duty truck wheels per side; long-wearing ceramic master clutch lining; and a constant mesh transmission that eliminates double shifting.

All in all, the Allis-Chalmers HD-11G is tops as a tractor shovel. Let your Allis-Chalmers dealer prove it to you in a demonstration. It will be well worth your while.

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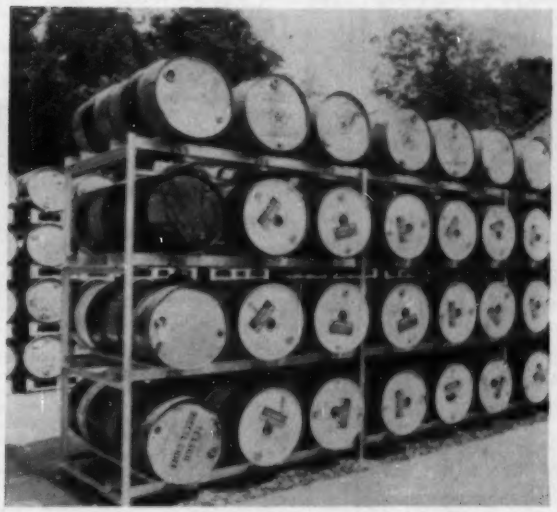
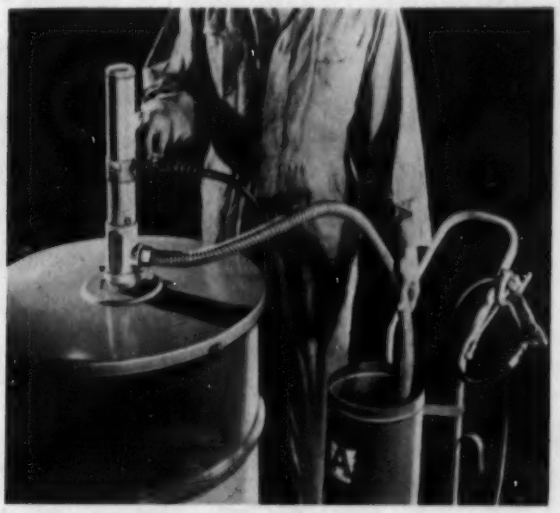


LUBRICANT DRUMS should be kept on their sides and on racks —not on the ground—when it is necessary to store them outdoors.



TRANSFER PUMPS that fit the standard grease or oil drum, such as this Alemite unit, prevent harmful contamination and waste.

# How to Store, Handle Lubes

WHEN DISCUSSING lubricants, the emphasis usually is placed on the necessity of choosing the right lube for the right job, the value of a good lubrication schedule, or the method of application. In addition to these factors, however, there is an equally important consideration that often is overlooked. This is the need for proper storage and handling.

"Petroleum suppliers take every precaution to see that lubricants are in the best possible condition when they are delivered to the contractor," says Dr. Robert K. Gould, staff chemist of the Technical Services Division, The Texas Co. "The user should exercise equal care to see that when the lubricant is applied, it is in the same good condition as when it was received."

Many things can happen to a lubricant between the time it is received by the contractor and the time it is applied. Careless handling, contamination, brand confusion, exposure to extreme temperatures, and leakage are the major hazards. These can result in damaged equipment, excessive maintenance costs, lost production, and fire hazards.

Lubricants are not "prima donna" products that require unusual care, but there are certain things that might occur during storage and handling that can lead to waste or render the lubricant ineffective.

Simple precautionary measures during storage and handling can avoid these pitfalls. Because no two maintenance shops are exactly alike and because numerous local factors, such as weather, must be considered, the storage problem will, of course, vary from shop to shop. A scheme which is suitable for one place may be unsatisfactory at another. However, Texaco has some basic "do's" and "don'ts" which apply to all storage and handling problems:

1. When selecting a storage area find a central location that makes hauling distances as short as possible. Also, select an area where the atmosphere is free from dust and vapors.

2. Store lubricants indoors if possible because the chances of contamination will be less. Contamination with dirt, dust, or other solid bodies can accelerate oil oxidation and shorten oil life. In addition, the abrasive properties of the contaminants are introduced into the lubricant.

3. If stored outdoors, drums should be placed on their sides on racks —don't lay them on the ground. When placed upright on end, rain water may accumulate and be sucked into the drum by its normal breathing action. If it is necessary to store drums on end outdoors temporarily, a cover should be available in the event of inclement weather.

4. Ideally, an indoor storage area should have fire-proof brick, tile, or concrete walls and floors and be fitted with suitable drains.

5. Cleanliness of the storage area is essential regardless of whether storage is indoors or outdoors. Orderlines is another must. Keeping different brands and types of lubricants separated reduces the chance for confusion and error.

6. Don't store more products than necessary. The lubricant supplier will be glad to make a survey of lubrication requirements, so that the number of different products can be kept to a minimum.

7. Remember that exposure to temperature extremes can damage lubricants. If there is any reason to suspect that this has occurred, examine the lubricant before using.

*(Continued on next page)*

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## MAINTENANCE SHOP...

**Continued**

If the product appears abnormal, consult the supplier as to what to do. If nothing worse, lubricants and greases stored in cold areas become viscous and stiff, and in such condition they are very difficult to handle.

8. Exercise extreme care when heating products that have been exposed to low temperatures. If possible, transfer drums to a warm area and allow the lubricant to reach room temperature. If more rapid heating is required, use exhaust steam. Never apply direct heat, such as a flame, to the exterior of the drum. This might melt the sealing compound and result in leaking. It might also harm the product.

### Handling

The mechanics by which the lubricant is transferred from its storage container to the point of application are very important. The transfer equipment used will depend upon individual circumstances. Transfer pumps that fit the standard grease or lubricant drum and permit the product to be removed from its original container without danger of contamination or waste are valuable aids. These pumps can be used effectively to transfer lubricants to smaller units, such as portable power guns or small containers.

Mobile lube rigs that can go into the field to service equipment provide a good dispensing method because they enable the mechanic to transfer the lubricant directly from the original container to the point of application, thus avoiding waste and contamination. Another way to avoid the intermediate transfer operation is to mount a drum equipped with a pump, hose, and control on a portable dolly.

### Other suggestions

1. All equipment used in transferring lubricants should be located in a central spot and kept as clean as possible.

2. Where many different lubricants are used, a simple code system can help avoid confusion. The code, whether it be alphabetic or color, should be clearly evident on the drum, the transfer equipment and, when possible, on the point of application.

3. Keep accurate records of lubricants and use the old stock first.

4. Keep fire-fighting equipment handy.


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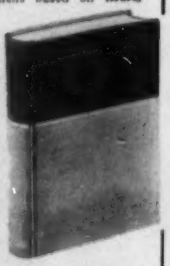

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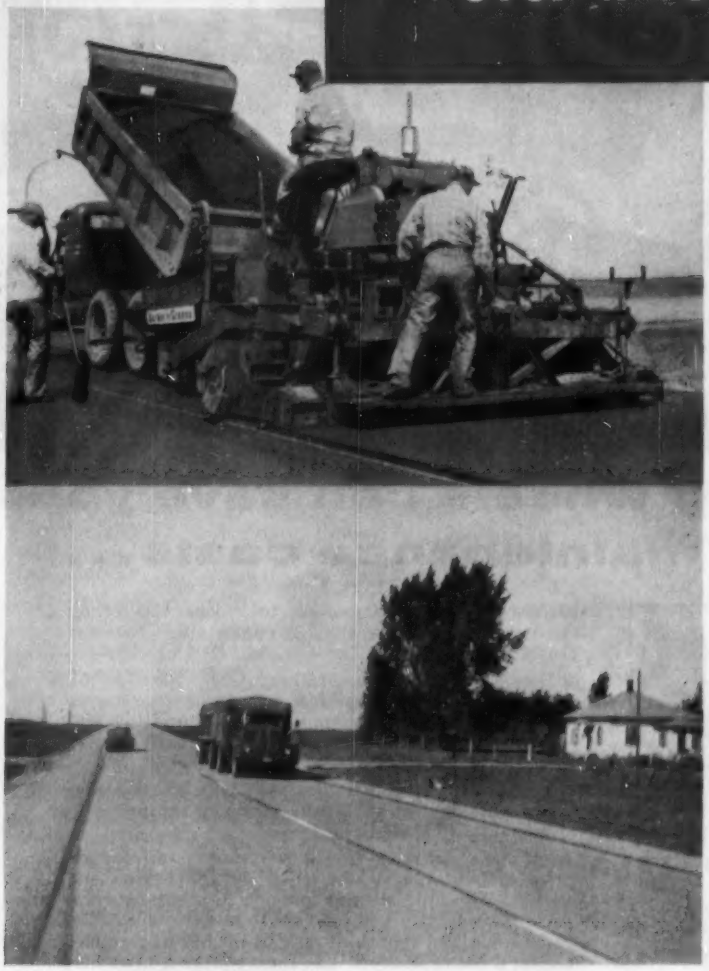
CM-3

# Spreading a highway's cost over a 10 year period



Paving 20 miles of South Dakota's Route 25 with an intermediate type of Texaco Asphalt construction, described in column at the right.

**CONTRACTOR:** G. H. Lindekugel & Sons Construction Co.

South Dakota completed the first stage of this 20-mile highway project in 1955, using an intermediate type of Texaco Asphalt pavement. Approximately 10 years from now, a hot-mix asphalt surface will be added, strengthening the original pavement and giving it a new lease on life.

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The first stage of the South Dakota project consists of a 9-inch gravel base, primed with Texaco Slow-curing Asphaltic Oil. A plant-mixed Texaco asphalt surface of the cold-laid type was constructed on the base to a compacted thickness of two inches, followed by a seal coat of Texaco Rapid-curing Cutback Asphalt and sand cover.

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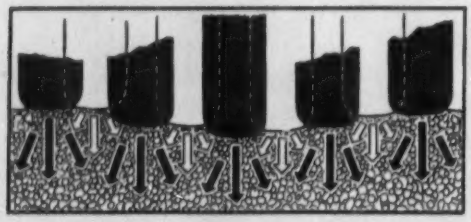
TEXACO

# TEXACO ASPHALT

# How oscillating wheels can save you untold street maintenance costs...



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*Find out, too, about the complete BROS TEAM. With the SP-54, the BROS Preparator and Roto-Mixer make the perfect combination for low cost street construction. The Preparator (in-place materials reducer) reduces native over-size materials and old blacktop to proper roadbed sizes. The Roto-Mixer stabilizes and blends the base and wearing course materials to improve load bearing values.*

Self-Propelled Roller  Roto-Mixer  Preparator

BROS

# Contractor-Labor Relations . . .

by LEON B. KROMER, Jr.

## Watch These Points in Bargaining

*This is the third in a CM&E series of articles on how to prepare in advance for your next collective bargaining session.*

THE TERMS "travel time" and "travel expense" are often erroneously used interchangeably. They are not, of course, the same, and if you are a member of a negotiating committee you want to be careful not to use one term when you mean the other. In collective bargaining, travel time may be defined as payment by an employer to an employee at the basic hourly rate for a specified amount of time estimated to be involved in traveling to and from the job. Because of many legal pitfalls, particularly in workmen's compensation cases, contractors are insisting that travel time clauses be deleted from agreements. Courts have held that, when wages are being paid to an employee while traveling to and from work, any accident during this travel time occurs during the course of employment and is a compensable disability.

Travel expense can be defined as reimbursement to an employee for expenses involved in traveling to the job, based upon a prescribed formula in the agreement. It is when attempting to spell out the formula that committees run into deep water.

Travel expense clauses usually cover the entire geographical jurisdiction of the union. If this area is small, travel expense may not even figure in negotiations. It is when the union covers a very large geographical area that writing the travel expense clause fairly and in a way to avoid disputes poses something of a problem. Added to this is the attitude sometimes encountered with union committees who want to supplement wages through the travel expense clause.

There are a number of ways to handle travel expense. Here is an example of how the problem has been met for unions with large geographical areas:

"Transportation expense to be paid for work outside the City (name) shall be on the following basis:

First five miles beyond city limits — no transportation expense paid. Second five miles or fraction thereof—fifty cents ($.50) round trip per man per day. Twenty-five cents ($.25) additional for each succeeding five miles or fraction thereof round trip per man per day. If bridge tolls must be paid the employer shall reimburse the members for the actual expense. In no case shall reimbursement for travel expense be had, where, under the terms of this section, no actual traveling is necessary to reach the job."

The merits of this clause are that it sets a reasonable rate for travel that applies equally to all contractors bidding competitively; it provides that no travel expense shall be paid for jobs within a certain area outside the city limits; and finally it provides that if no travel is involved, no expense shall be paid.

Here are two examples of poorly written clauses:

"The employer agrees to reimburse the employee, member of this union, for traveling expense at nine cents ($.09) per mi for mileage traveled outside a 10-mi radius of the center of the City of (name) and within the jurisdiction of Local union—"

"If a contractor sends men to a job, he is to provide transportation or pay $.06 per mile on jobs beyond the City Bus Lines."

These two clauses are not clear. The first one raises these questions: Where is the ten mile radius? Where is the center of the city? Without a map attached to the contract with the agreed upon 10-mi radius circle clearly drawn this type of clause leads to disputes. The second caluse could lead to trouble because bus companies sometimes discontinue or change routes. Although both clauses were taken from agreements covering five or six counties, neither provided that if no actual traveling is involved no expense shall be paid.

Remember these points when considering travel expense clauses:

- The clause should apply equally to all contractors so that they are on the same competitive basis for bidding on projects in the area.
- It should be clear to avoid labor disputes and so that contractors know what they are expected to pay.
- It is basically reimbursement for extra expense involved in getting to a job and should not be a means of supplementing pay.

### Work Jurisdiction

In spite of the fact that the most common and serious disputes arise over work assignments, many agreements fail to mention jurisdictional disputes and what to do should they come up. Even though machinery to resolve jurisdictional disputes without work stoppages has been in operation for over seven years, few agreements provide that it shall be used.

Yet, through agreement between major national organizations of contractors and all of the international unions affiliated with the Building Trades Department, all local unions are bound to follow the procedures established by the National Joint Board for the Settlement of Jurisdictional Disputes. Contractors or associations of contractors (acting for their members) are bound by Board decisions after signing a stipulation to that effect.

It is to the advantage of contractors employing members of the building trades to follow the procedures set up for assigning work subject to possible dispute. In the event of a strike, the contractor is assured of immediate action by the Chairman of the Joint Board. Once he is notified, he will direct the international union to order its men back to work.

Contractors on the other hand, are committed to follow "agreements of record" and "decisions of record." These are published in the so-called "Green Book" by the Building Trades Department, and they often provide the answer for contractors in doubt as to the trade to assign to a particular part of the work.

Union negotiators will want their jurisdiction spelled out in the agreement. A statement recognizing the Joint Board processes can be coupled with one setting forth in general terms the jurisdiction of work for the union. In addition,

*(Continued on next page)*

**LABOR... Continued from page 201**

there should also be the requirement that there will be no stoppages of work because of jurisdictional disputes. Here is an example:

"The work jurisdiction covered by this agreement is that granted to (name of international union) as well as that class of work performed by members of Local Union No.— by virtue of area practice. Should any question of jurisdiction arise there shall be no strikes or lockouts. If possible the dispute should be adjusted on a local basis. Should this fail, then the matter is to be handled in accordance with the procedures set forth by the National Joint Board for the Settlement of Jurisdictional Disputes."

Don't spell out too specifically the work jurisdiction of the union. Confine the clause as much as possible to general language and avoid including work that is not within the jurisdiction of the union or is subject to some doubt. You head straight for trouble if you include work not clearly within a single union's jurisdiction.

### Shop Steward

Every building trades union requires that a stop steward be appointed for each construction job on which members are employed. Many agreements cover this by providing that a shop steward shall be appointed by the Business Agent and shall be employed so long as a certain number of the trade are on the job. Some agreements go further and state that he may not be discharged at any time other members of the trade are employed.

There has been so much abuse of this provision that unions are agreeing, under strong pressure from contractors to change it.

It is important that contractors recognize that it is necessary from the union's point of view to have a steward on the job. In performing his work the union wants him protected against any discrimination because of his activities in the union's behalf.

It is equally important that the union understand that the contractor has a right to expect the steward to put in a reasonable day's work. Also, there must be means whereby the contractor can, without running into a serious dispute, discharge the steward for incompetence or other just cause.

Here is an example of a clause that attempts to protect both the union and contractor:

"There shall be a steward on each job, and he shall be appointed by the Business Agent. It is the steward's duty to look after the interests of both parties, see that the number of men desired by the employer is promptly reported to the Business Agent, take up all grievances on the job, and try to have same adjusted. In the event that he cannot, he must report that fact to the Business Agent. He shall conduct himself in a proper manner at all times when on the project and shall not be discriminated against, discharged, or laid off for the performance of his duties as such. He shall be retained on the job as long as two or more members are working on the job, subject to his ability to perform the work in question. In the event that the contractor desires to replace the steward for inefficiency or other cause he shall confer with the Business Agent. If the contractor and Business Agent cannot agree upon a replacement, the matter shall then be referred to the Arbitration Committee as provided in Article— herein."

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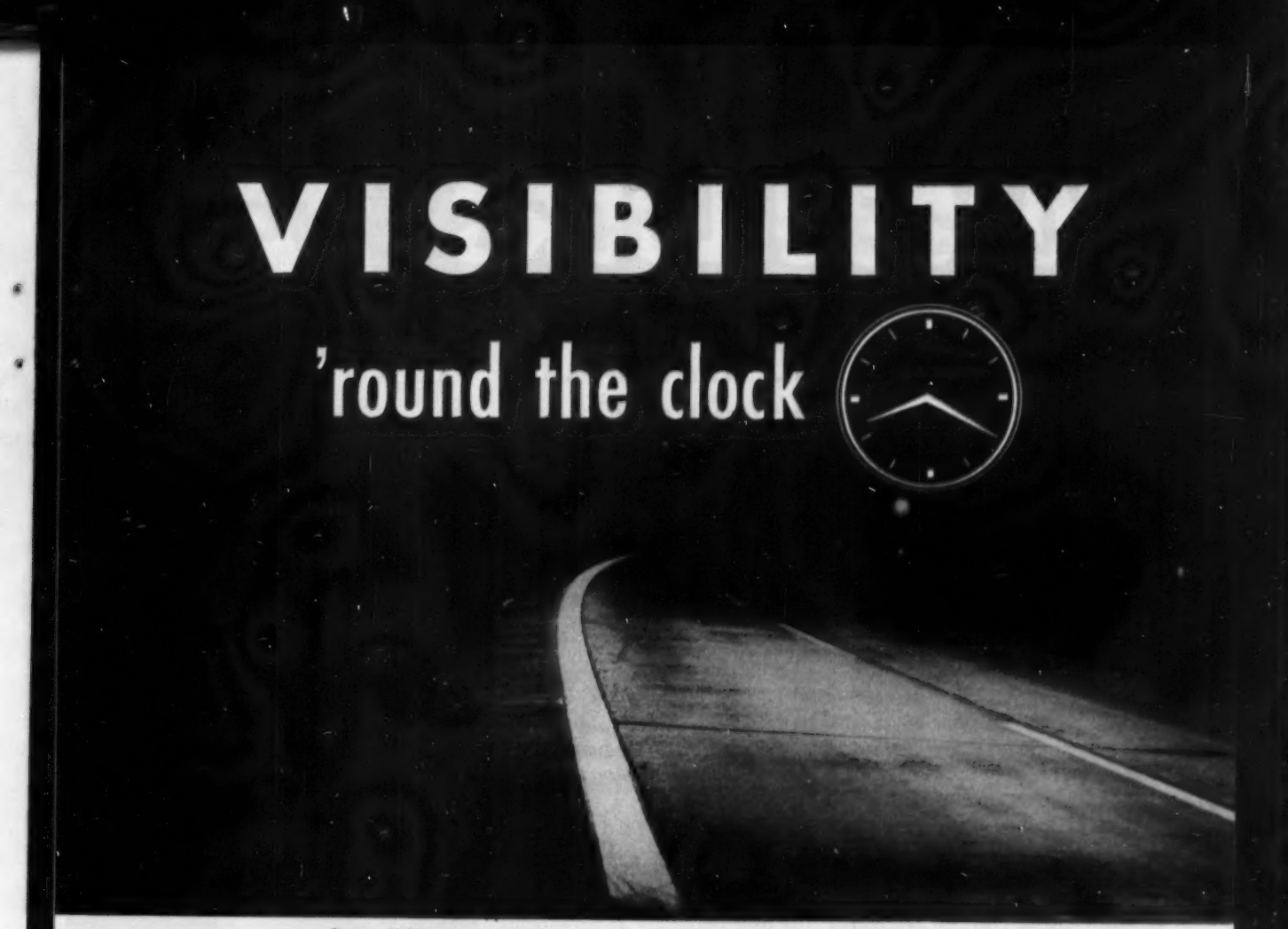
# VISIBILITY

## 'round the clock



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# ROADBUILDERS! HOW

## New SEAMAN-ANDWALL TRAV-L-PLANT COMPLETES 22-FOOT BITUMINOUS ROAD BASE AT MILE-A-DAY RATE

New speed in road building is announced by the Seaman-Andwall Corporation, which now offers a complete line of equipment for stabilized road construction. Roadbuilders who have been interviewed state that Seaman-Andwall Sta-Bilt equipment provides better, more durable bituminous roads at lower cost with greater strength, higher densities — built at a mile-a-day production rate.

Much of the credit for this road building speed-up is given to new versatility built into the Seaman Trav-L-Plant, a double-duty and often triple-duty machine that performs "in-place" mixing and binder application together with light scarification in one time-saving simultaneous operation.

Not only is the TRAV-L-PLANT used for new bituminous road construction, but it is widely accepted as fast, economical equipment in reconstruction of old, worn out bituminous roads. In such work the TRAV-L-PLANT as it mixes, quickly reduces the previously scarified material to original aggregate size ready for compaction.

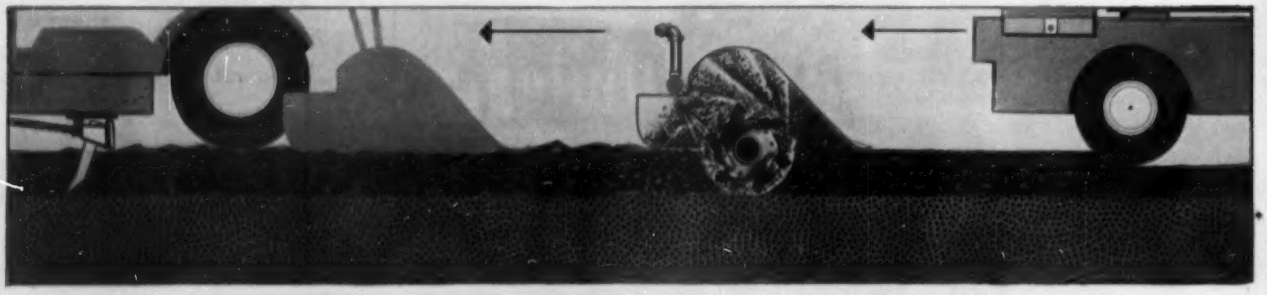
The basic operation of the Seaman equipment is that of soil stabilization — the "in-place" mixing, blending and assembly of the base materials. It thoroughly mixes the fines and coarse materials so that voids are filled, and larger aggregates are interlocked and securely mortared-in by the fines. The mix compacts to higher, much higher, densities for greater load bearing value, longer wear and much lower maintenance.

The TRAV-L-PLANT pumps binder into the mix from a transport truck operating at the side or ahead. Full tachometer assemblies and volumetric meter provide precision application through a spray bar positioned in the mixing chamber. Binder is applied directly into the mix. Because there is no time delay between base stabilization and binder application and mixing, the bitumen has no time to cool before it's in the mix. Run-off or migration is also entirely prevented.

Above — Seaman Self-Propelled TRAV-L-PLANT in bituminous parkway construction, Jacksonville, Fla. Binder is pumped from transport ahead of the Seaman.

**S-A Sta-Bilt Method of Road Stabilization**

The Seaman-Andwall TRAV-L-PLANT scarifies old bituminous material; the rotor reduces the lumps to original aggregate size and, simultaneously, new binder is applied through spray bar mounted just ahead of the rotor. Compaction follows immediately after the TRAV-L-PLANT has completed its operation.

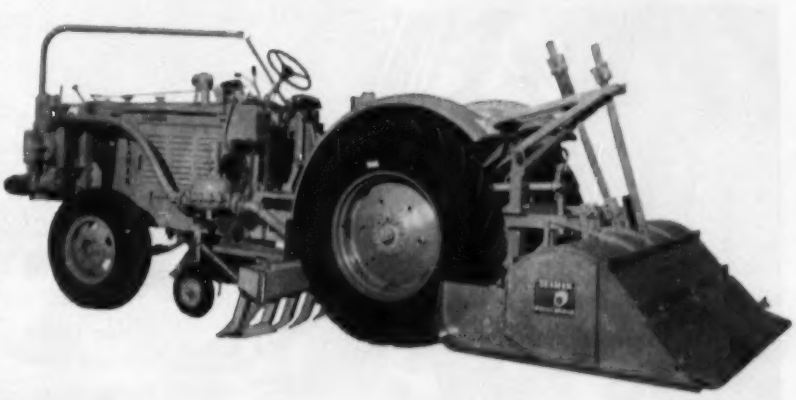


# TO BEAT THE CLOCK...

The TRAV-L-PLANT leaves the surface partially compacted, ready for final rolling, an operation further improved by the new Seaman-Andwall compactor. These rollers offered in steel wheel and pneumatic models apply power to the *front* rolls. This produces a "straight down" pressure which eliminates shoving, shearing, scuffing and tearing of the surface which is so often the case with rear drive rollers. By this principle the task of compaction is correctly accomplished in much less time, and with fewer trips to attain specified density.

**SEAMAN TRAV-L-PLANT**

Today's most versatile road-building machine. Equipped with pump tachometer assemblies, volumetric meter, spray bar to apply bitumen or water simultaneously with mixing-in-place operations. Also available with new UNDERBODY SCARIFIER — for extra versatility.

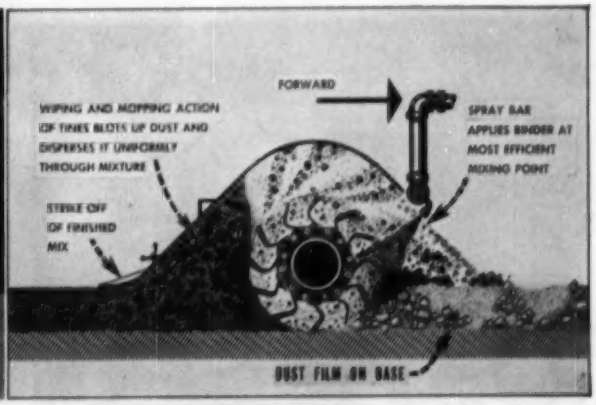


### NEW S-A UNDERBODY SCARIFIER

Mounted between rear and front wheels of the TRAV-L-PLANT, this unique new Scarifier Attachment can often be used for light scarification and frequently in the same operation with mixing and binder application, depending on conditions. Easily attached, it adds one more operation to the TRAV-L-PLANT efficiency.

### S-A SPRAY BAR AND MIXING CHAMBER

Illustration shows location of spray bar just ahead of tines on TRAV-L-PLANT. Binder is instantly mixed without any opportunity for run-off or migration. Notice blending of fines and coarse with aggregates interlocked to correct segregation.


FORWARD
WIPING AND MOPPING ACTION OF TINES BLOTS UP DUST AND DISPERSES IT UNIFORMLY THROUGH MIXTURE
SPRAY BAR APPLIES BINDER AT MOST EFFICIENT MIXING POINT
STRIKE OFF OF FINISHED MIX
DUST FILM ON BASE

*Stabilizing the World*

**GET THE FACTS!**

*Write for Bulletin TPS-8-34 "SEAMAN METHOD OF BITUMINOUS STABILIZATION"*

**SEAMAN-ANDWALL CORPORATION**

**280 North 25th Street • Milwaukee 1, Wisconsin**

(Advertisement)

# They're building Kansas City's new foundations —1,500 to 2,000 yards a day

## Red D Mix's new fleet of GMC's helps speed in-a-hurry jobs like the 30,000-yard delivery for K.C.'s new municipal parking garage

THESE RUGGED GMC W624 TANDEMS are some of the 20 new GMC haulers handling Red D Mix's fast-moving, tightly scheduled jobs throughout the Kansas City, Mo. area. They recently completed work on Kansas City's municipal parking garage — a multi-floor, block-square structure requiring 30,000 yards of concrete. Red D Mix helped finish this massive job in record time.

SPEEDING THEIR HEFTY 6-YARD LOADS from batch plant to job site, these GMC W624's set a crackling pace. The model is one of 19 new Blue Chip tandems blanketing the 28,000 GVW-90,000 GCW range. They offer a choice of gasoline and 2-cycle Diesel power. And 9 of them are available with cost-cutting Hydra-Matic.*

*Hydra-Matic standard on many models; optional at extra cost on some others

NOT EVEN THE ROUGHEST GOING can stop these GMC's. Their high-torque 190-h.p. engine packs more than ample reserve for off-the-road maneuvering. And the W624 has GMC's new oversized axles — 11,000 lb. front and 34,000 lb. rear. Tires are 9.00/20's. The rig's rated for 42,000 GVW-65,000 GCW truck-work.

**GMC TRUCK & COACH — *A General Motors Division***

# Construction Men in the News . . .

## McGraw Expands For Big Job

F. H. McGRAW & COMPANY is adding three new vice-presidents and nearly 200 engineering and office personnel to its organization. The move follows the award of a $90 million engineering and construction contract by Olin Mathieson Chemical Corp. for its new aluminum plant in Ohio. McGraw company stockholders recently voted to sell 40% of its common stock to Mathieson in exchange for the contract.

New vice presidents are (left to right), **A. K. FERGUSON**, formerly president of the H. K. Ferguson Co., of Cleveland, **PAUL F. PAPE**, and **CHARLES DuBOSE.**

Ferguson, veteran construction engineer and well-known industrial builder, after leaving the Ferguson company, founded by his father, was an officer of Walter Kidde Construction Co. He has been actively engaged in construction since 1923. Ferguson studied engineering at Ohio Weslayan and Northwestern Universities. During World War II, he served on several Army construction projects. In 1945 was elected president of the Ferguson company. His most recent work has centered around engineering studies for railroad and mining interests. He lives in Princeton, N. J.

Pape, an engineer, has served with McGraw since 1946 as chief engineer and project manager. In his new post he will be in charge of engineering. During World War II, he was engaged in the construction of military installations in Newfoundland, Labrador, Greenland, and the Oak Ridge Atomic Plant. After the war he served on several missions to foreign countries in connection with construction programs.

DuBose, who designed the Monmouth Park race track in New Jersey, has been an architect in the New York area since 1933. Following an international competition he was awarded a commission to design a new capitol building for the Republic of Ecuador and later one to design a new airlines terminal and airport for the Republic of Panama. DuBose will supervise operations of the McGraw company's Canadian subsidiary in Toronto.

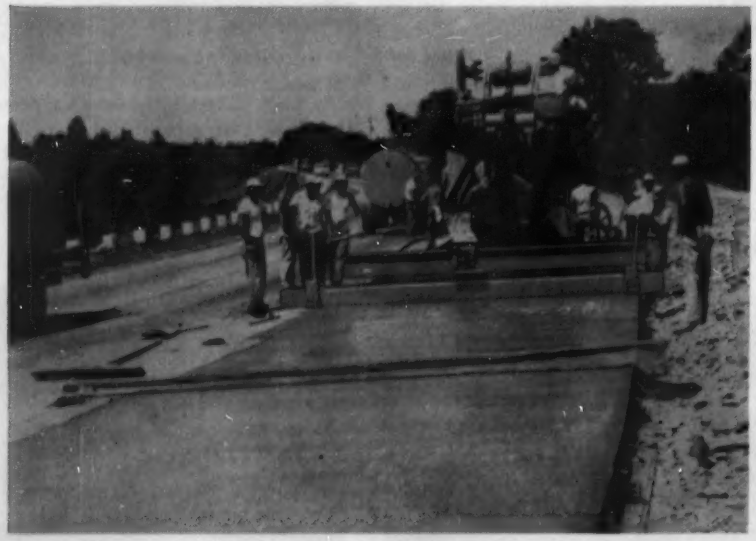
## Ferguson Elects Director, Makes Appointments

**RALPH W. OLMSTEAD** is a new director of the H. K. Ferguson Company of Cleveland. The firm announced his election along with the appointments of **EDWARD L. HELLER** as head of a specially formed group to supervise design and construction projects in the field of atomic energy, and **JOHN B. ESSERY,** as contract manager for the firm's new Toronto headquarters.

Olmstead, a vice-president, has been associated with Ferguson and

# When a SCREED saves you $500 on 50,000 square feet of concrete— *that's NEWS!*

Here's the story: The contractor on this warehouse job purchased the 33′ STOW Screed to strike off a warehouse floor of 1″ slump concrete. By using the 33′ screed instead of the 12′ screed he had been using, the contractor estimated that he saved $500.00 on the 50,000 square feet poured. With a 1″ slump concrete, the slab set up so fast that they were able to put a trowel on the job only 1 hour after screeding.



**Screeding a Third Lane on a Hill.** This job was too small for the contractor to put his big finishing machine on the job, so he used a 14′ STOW Vibrating Screed. This screed can be bought as a packaged unit to be mounted on your own beam. For more information on screeds, write for STOW Catalog 560.

STOW MANUFACTURING CO.
31 SHEAR STREET, BINGHAMTON, N. Y.


## CONSTRUCTION MEN...
**Continued**

its parent company, Morrison-Knudsen Company, Inc., for five years. He joined Ferguson in January, 1954, as assistant to the president and was made a vice president later that year. He also is a director of Ionic, Inc., research and equipment firm of Cambridge, Mass.

Heller was former staff engineer for the Joint Congressional Committee on Atomic Energy. Other members of the group he heads will be engineers and construction supervisors who have had experience on atomic energy projects. The group will be located in the firm's Cleveland offices. Heller resigned from the Congressional Committee staff early this year after nine years of service in Washington. His duties as staff engineer were to follow all major developments and activities of the Commission, including its programs for design and construction of facilities, plant operations, weapons development, research, and industrial adaptations. He has an engineering degree from Lehigh University and a graduate degree from the Harvard Business School.

Essery, a native of Toronto, was educated at upper Canada College, the University of Toronto, and Osgoode Hall. He has been active since World War II in engineering and construction throughout Canada.

**BRIG GEN. DAVID H. TULLEY,** Assistant Chief of Engineers for Military Construction since April, 1953, will become Commanding General of the Engineer Center at Fort Belvoir, Va. on May 1. He succeeds **MAJ. GEN. LOUIS W. PRENTISS** who recently retired from the Army to become executive vice president of the American Road Builders' Association (CM&E, Feb 1956, p. 165).

**COL. LAWRENCE J. LINCOLN** will be the new Mediterranean Division Engineer. He succeeds recently retired **BRIG. GEN. B. B. TALLEY**. Col. Lincoln is at present Acting Chief of Staff, Fourth Army, Fort Sam Houston, Texas.

**COL. HERROL J. SKIDMORE** is successor to **COL. GEORGE T. DERBY** as District Engineer, Huntington, West Virginia District. Skidmore is Deputy Engineer, Seventh Army, Europe.

(Advertisement)

# New Rotary Trowel enters field

"What we need is a really rugged trowel, one that can't get away from you and crack up", said one veteran concrete man when interviewed.

Because Stow Manufacturing Company, makers of concrete vibrators and screeds in Binghamton, New York, decided to make a Rotary Trowel, an exhaustive study was conducted to find out what concrete men wanted in a Rotary Trowel. Stow knew they were getting into a field where competitive manufacturers were well established, and that they had to come up with a machine that would be superior to any other on the market.

Thousands of dollars were put into the design and perfection of the Stow Roto-Trowel. The result: the G-34 Roto-Trowel; a rugged, safe, easy - to - handle machine that trowels smoothly.

STOW ROTO-TROWEL FINISHING A SUPERMARKET FLOOR. Before trowelling, a Stow screed was used to strike-off the surface. By screeding and using a 1" slump concrete, the concrete set up so fast, they were able to put the Roto-Trowel on the job only 1 hour after screeding.

Probably the most outstanding feature on the G-34 Roto-Trowel is the stationary guard ring, instead of the conventional rotating type. With the rotating type guard ring, the operator must be extremely careful whenever he works near walls and obstructions; if the ring should touch any object, it could wreck the trowel and injure the operator. With the Stow Roto-Trowel's strong stationary guard ring, the operator can trowel much closer to walls and obstructions with no fear of accidents.

Another feature is the fool-proof clutch control. This is a manually actuated clutch controlled by a lever on the handle. The instant the operator releases pressure on the handle, the blades stop rotating. The engine, however, continues to operate, thus eliminating the need to re-start the engine. This type clutch is an important safety feature of the Stow Roto-Trowel; and unlike centrifugal clutches, the engine can be started at full throttle. With this type of drive, the operator can throttle the trowel down from 100 RPM to 25 RPM where special conditions require slow speed.

THIS DEAD-MAN CONTROL on the wide cross-bar of the handle immediately stops the machine, but not the engine, when it is released.

The Stow G-34 Roto-Trowel is powered by a 2½ HP gasoline engine which supplies ample power for even high slump concrete. The unit has an adjustable handle so the operator can set the height to his most comfortable operating position. This feature, plus the wider handle, makes the Roto-Trowel much easier to maneuver, regardless of the height of the operator.

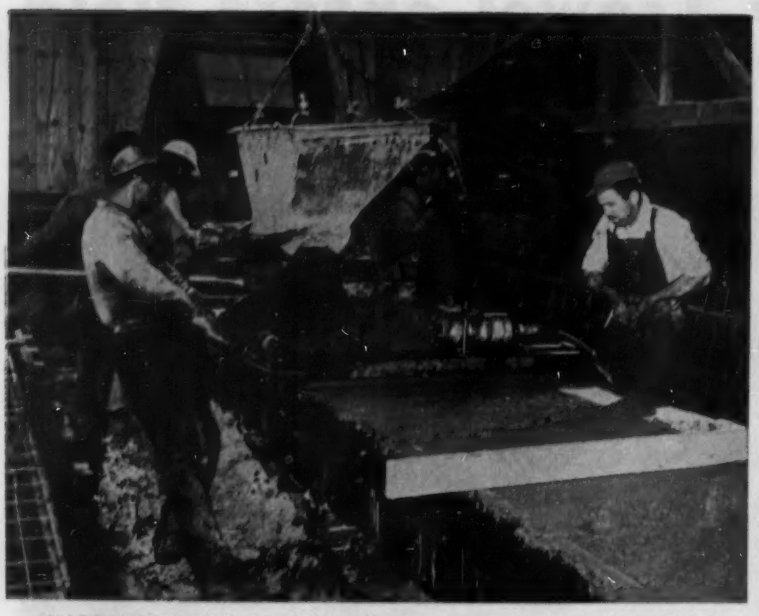
On a construction job where one Stow Roto-Trowel was put in among competitive trowels, the contractor discovered that his trowel operators were actualy arriving on the job early each day in order to use the Stow Roto-Trowel. They found it much easier to handle.

A hook mounted on top of the engine makes it easy to lift the Stow Roto-Trowel to higher levels. A knob on the handle controls blade pitch while the machine is running. All three blades fit into recessed slots to insure correct seating; each is secured by a hand-turned wing nut for quick changing. Float blades are 10x14 inches; finish blades are 6x14 inches. Finish blades are made of the finest steel available, chrome vanadium, and can be reversed for double life. The G-34 Roto-Trowel, complete with a set of float and finish blades, weighs 143 lbs. and is 34 inches in diameter.

Stow now has a 24-inch model, the G-24, and a big 4-bladed 46-inch trowel, the G-46. A 34-inch electric trowel is also available with 1½ HP motor.

Contact your nearest Stow Distributor for a demonstration, or write Stow Manufacturing Co., 31 Shear St., Binghamton, N. Y. Ask for Stow's complete catalog on Concrete Vibrators, Portable Concrete Grinders and Vibrating Screeds, and Rotary Trowels.

STOW MANUFACTURING COMPANY
31 Shear Street
Binghamton, New York
*Originators of the Flexible Shaft*



**WORKMEN ARE SHOWN vibrating concrete in thin-shell precast roof panels using Viber Model PX pneumatic vibrator mounted on screed.**

# Contractor Casts 2-Inch Reinforced Roof Panels with Special Screed Using Viber Standard External Vibrator

CONTRACTOR FOR MORE THAN 740 precast, thin-shell roof panels for an earthquake resistant reservoir at the new San Pablo Filter Plant, El Cerrito, Calif., devised an efficient method of vibrating reinforced concrete webs only 2 inches thick.

P. Grassi-American Terrazzo Co., San Francisco, developed a screed on which a Viber standard Model PX pneumatic high speed vibrator was mounted. Thus concrete was screeded and vibrated in one operation.

Precast panels were 24 ft. long by 4 ft. wide with webs 2 in. thick. In addition to being thin in section, webs were reinforced with welded wire fabric making these areas virtually inaccessible to internal vibration. This made external vibration necessary.

Following proper curing, panels were hoisted by crane and placed on girders also precast by the contractor. Dimensional accuracy of precast panels was good, facilitating placement which was done at the rate of 10 panels in less than one hour. Panels were then welded to inserts in girders to make structure solid.

Viber's Model PX concrete vibrator selected by the P. Grassi-American Terrazzo Co. is used widely in pipe yards and tunnel lining operations wherever reusable steel forms are set up for use on a production basis.

For further information on Viber's complete line of internal and external vibrators, contact your authorized distributor or Viber Company, Dept. 8-A, 726 So. Flower Street, Burbank, California.

PRECAST ROOF PANELS shown welded in place were set on girders by truck-crane. Channel side is 8 inches deep and has shelf to retain grout seal.

VIBER

CONCRETE VIBRATORS SINCE 1931

## Sales and Service...

*Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.*

### Distributor Appointments

**Huber-Warco Co.:** The Mitchell Distributing Co. of Spruce Pine, N. C., will represent Huber-Warco's complete line of tandem rollers, three-wheel rollers and graders in North Carolina.

**Clayton Manufacturing Co.:** The manufacturers of the Summeraire portable space heater have announced a list of territorial distributors. They are: Anderson Equipment Co., Pittsburgh for West Virginia and Western Pennsylvania; Western Machinery Co., Denver, for Colorado; Palmer Equipment Co., Detroit, for six Michigan counties; Cleveland Contractors Equipment Co., Cleveland, for Northeastern, Ohio; Lorenz Equipment Co., Columbus, Ohio, for Southwestern and Central Ohio; Trevor Corp., Buffalo, for Western New York; Western Machinery Co., Salt Lake City, for Utah, Southern Idaho and Eastern Nevada; Construction Equipment Co., Ltd., Edmonton, Alberta, Canada, for the Provinces of British Columbia, Alberta, Saskatchewan and Manitoba, and Construction Equipment Co., Ltd., Montreal, for Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland.

**Heil Co.:** Rivers Body Factory, Tampa, will handle truck bodies and hoists in west central Florida, and Irvin F. Nelis Assoc., Houston, will be Heil's distributor in Southeastern Texas.

### On the Sales Front

**Insley Manufacturing Corp.:** Three new sales division appointments have been announced recently. Fred B. Ray, foremerly vice-president for sales, becomes vice-president in charge of sales research and development; R. J. Boatman, factory sales representative, was named sales manager, and C. W. Hoke has been named advertising manager.

**Thor Power Tool Co.:** Harry L. Artinger, an industrial service engineer in the Pittsburgh area for the last 10 yr, has been named Pittsburgh branch manager.

**Kaiser Aluminum Corp.:** Richard M. Gerber has been appointed manager of the rapidly expanding building-

**NOW**... out of 250 million hours of flight power experience comes

# a NEW air-cooled industrial engine the FULL POWER LYCOMING C2-90

**Rated 30 H.P.! Delivers 30 H.P.!**

## Specifically designed to solve construction industry problems

The C2-90 is built to the same high standards that have made Lycoming a top name in aircraft engines for over a quarter century. The C2-90 does just what we say it will do—work at full power under the most rugged conditions. So why buy an engine you have to de-rate (up to 50% for continual duty service)?

**Reserve Power**—C2-90's full-power rating provides ready reserve for everything from heavy generators to light pumps.

**Long Life**—C2-90 is ruggedly designed for thousands of hours of dependable service.

**Cooling Design**—C2-90 provides newly improved cooling surfaces to avoid overheating from dust conditions; a cooling fan that operates through entire speed range.

**All-Weather Performance**—C2-90 advanced air-cooled design delivers rated output in high temperatures or sub-zero.

**Imagine running your car for 80,000 continuous miles without service!** In Williamsport, Pa., the C2-90 was test-run at full load, full throttle for over 1,000 continuous hours with no service except for gas and oil. This is equivalent to running your auto 80 miles an hour for 1,000 hours non-stop, or 80,000 continuous miles *without service!*

LOOK TO

For full details on the new Lycoming C2-90 write:

Sales Engineering, Industrial Engines,
Lycoming, Williamsport, Pa.

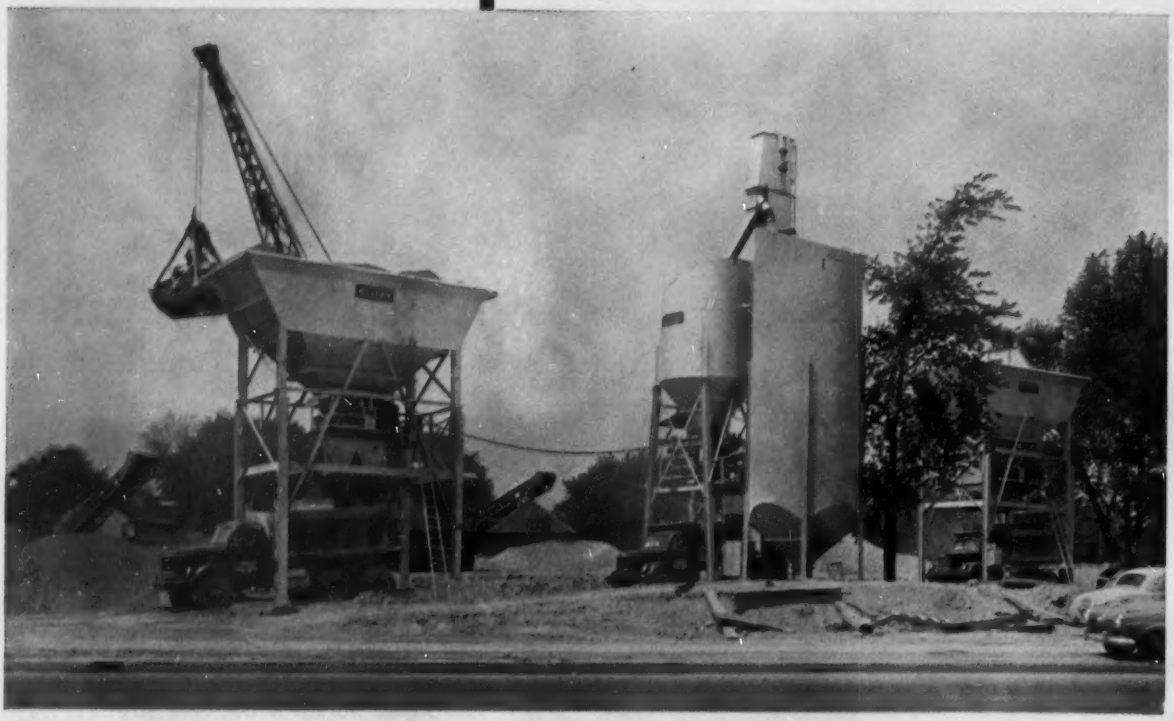
Lycoming

AVCO MFG. CORP.

**defense and industrial products**

combine the scientific skills, and production facilities of 3 Avco divisions of Avco Manufacturing Corp. . . . Lycoming; Avco Advanced Development; Crosley—to produce power plants, electronics, air-frame components, and precision parts.

# SO AUTOMATIC AND INTERLOCKED | this plant could be its own inspector



## The BUTLER 0-1-0 Roadbuilders Set-Up

Completely fool-proof, quality control and batching accuracy are *absolute* in the BUTLER 0-1-0. Every batch is the same. Banished are errors caused by operator fatigue.

Master Controls for each batcher are pre-set for any specified batch proportion and are not touched again until the concrete specifications are changed.

**ONLY ONE MAN,** stationed at the cement batcher, operates a simple set of push-buttons to control batching of *all materials* — sand, cement and 2 sizes of stone.

**ONLY ONE INSPECTOR,** (instead of three) is needed — and for all practical purposes he and the operator can take turns going fishing. All gates are interlocked so they can't discharge until the correct weight is in the hopper. Nor can the batcher be charged until the previous batch is cleared.

And the BUTLER 0-1-0 is the world's most portable plant. Hours instead of days to erect or dismantle!

It all sums up to this: one man operation and high portability slash costs so drastically that the contractor with a BUTLER 0-1-0 *can bid any job successfully and make a better profit* against competition owning yesterday's equipment.

If preferred, instead of batching all materials from the central station, the truck drivers can batch sand and stone from cab by push button control mounted on bin columns.

*Just off the press! A Bulletin completely describing the new automatic BUTLER 0-1-0. Write for it today. We'll send it to you — RUSH!*

**BUTLER BIN CO.** | 949 BLACKSTONE AVE. WAUKESHA, WISCONSIN

*Advertisement*

## 99 ft. Continuous Pour Using Richmond Tyscrus Believed Record

### M-C & S designs forms for pour without interruption

What is thought to be the highest continuous pour in the area was made by Merritt-Chapman & Scott on its pier construction for the Newark Bay Bridge. For each of the 41 piers on the Newark side of the bay, and the 16 piers on the Bayonne side, forms were designed for a 10′ liquid head and were set to the full height of the pour. Richmond Tyscrus were used throughout; 123 1″ 4-strut Richmond Tyscrus holding the highest placement – 99′ 9⅜″. Concrete was poured to the maximum design strength of tie rods and forms, and every column went up without incident.

For speeding all types of concrete form work, the extra safety margin of Richmond Tyscrus counts heavily. The actual load strength of Richmond Tys far exceeds their published load. For instance, severe performance tests conducted by Brooklyn Polytechnic Institute show that 1″ 4-strut Richmond Tyscrus (published safe load strength 24,000 lbs.)–identical with those used on the Newark Bay Bridge–actually test out at 38,000 lbs.

Hangers, Screed Chairs, Lagstuds and all Richmond equipment are made with the same professional attention to the contractor's needs as are Richmond Tyscrus. Write for the 1955 Richmond Catalogue which details Richmond products and their many uses. It can save *you* time and money on your next job. Address:–RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Avenue, Brooklyn 8, N. Y., or 315 South 4th Street, St. Joseph, Mo.

## SALES AND SERVICE . . .

**Continued from page 210**

products department. Gerber was formerly business manager of Industrial Publications, Inc., and vice-president of Western Brick & Supply Co.

**Universal Atlas Cement Co.:** The appointment of John T. Hughes as assistant sales manager of the New York territory was announced recently. He was a member of the sales staff of the Boston office.

**L. O. F. Glass Fibers Co.:** William M. Temple has been named manager of Government sales. Previously he had been manager of the Washington, D. C., office of the Owens-Illinois Glass Co. Don McAnally has been appointed sales promotion manager of the company, according to J. M. Johns, vice-president and director of sales.

**Dewey and Almy Chemical Co.:** Sam D. Burks, a veteran of 16 yr with the U. S. Corps of Engineers, will direct the sales of construction specialties to the concrete industry.

**Duff-Norton Co.:** Edward H. Hodgson is the new district sales manager of the Pittsburgh office to direct sales throughout Ohio of Duff-Norton jacks and hoists produced by the firm's Coffing Hoist Div.

**Howe Scale Co., Inc.:** Philip C. Cook has been named sales manager of the newly created truck division. The appointment coincides with a new program calling for truck redesign and wider activity in distribution and service.

**Economy Forms Corp.:** T. C. Kenna has been named sales engineer in charge of the Charlotte office. He will represent the Des Moines, Iowa, firm in North and South Carolina, eastern Tennessee and northeastern Georgia. Lewis T. Morgan is sales engineer for the eastern half of Wisconsin, the upper peninsula of Michigan and the northeastern part of Illinois.

### In the Main Office

**Greer Hydraulics, Inc.:** John W. See, formerly associated with Allis-Chalmers, has been named application engineer for hydraulic devices used in the material handling equipment industry. He will work with manufacturers, distributors, and users of fork-lift trucks, bucket-loaders and similar equipment in which hydropneumatic accumulators serve as shock absorbers.

**Timken Roller Bearing Co.:** The appointment of Lawrence J. Halderman of Los Angeles, a veteran executive of Timken, as director of the General Components Div. of

D·A

**OFFERS YOU... the heavy equipment user...**

**Superior lubricants** designed specifically for your equipment *plus* D-A Personalized services including:

1. **24 Hour Diesel Fuel Analysis** — To determine sulphur content —distillation characteristics— and ASTM grade.
2. **24 Hour Used Oil Analysis**—To establish maximum safe drain periods.
3. **Recommendation Books** — Containing factory approved recommendations for all heavy equipment.
4. **Service Bulletins** — On "Up-to-the-minute" factory recommendation changes.
5. **Prompt on-the-job Attention**—To your lubrication problems.
6. **Periodic Equipment Surveys**—To aid you in the correct lubrication of your equipment.

*D-A Personalized Services* are available without cost or obligation. Why not talk it over with the D-A representative in your area?

• • •

WRITE TODAY FOR THE NAME OF THE D-A REPRESENTATIVE NEAREST YOU!

D·A

**D-A LUBRICANT COMPANY, INC.**

*Indianapolis 23, Indiana*

SPECIALISTS IN HEAVY-DUTY LUBRICATION SINCE 1919

White

PORTABLE ASPHALT PLANT

MODEL L-8, 10-15 TON CAPACITY

Stationary Plants L-12 and L-25, 15-30 ton capacity.

A *COMPLETE* ASPHALT PLANT ON ONE CHASSIS . . . DRYER, MIXER, HEATING KETTLE. Low in cost, small enough to tow, BIG enough to produce HOT mix, (or any other bituminous mix) for driveways, parking lots, street maintenance, etc. Equipped with 50 HP LeRoi engine, air operated gates for *one* man control, divided compartment, reciprocating feeder for proportioning aggregate. Available as stationary plant with 30 HP electric motor.

Write for catalog and name of nearest dealer.

White MANUFACTURING COMPANY

ELKHART 6, INDIANA

"The Most Satisfactory Ditching Machine We've Ever Operated"

Say Jay Cundiff and Mac McVain Southwest Contractors, Bainbridge, Ga.

"We recently purchased our third Vermeer Model 4T Pow-R-Ditcher. This "Midget ditcher" is ideal for digging in those "tight spots." It is the most compact and satisfactory ditcher for gas service connections that we have found."

"Easy to transport," says Mac McVain.

VERMEER 4T POW-R-DITCHER DIGS FOR LESS BECAUSE IT COSTS SO MUCH LESS

The 4T Pow-R-Ditcher is only 42" wide and is easily transported in a pickup truck. Digs 6" to 14" wide and 4½' deep. Ideal for laying gas pipe, service lines and digging foundation footings. Only 6' high, 13' long, the 4T is self-propelled and one-man operated. Same size moving parts as larger models. Write for name of distributor and full information on the complete Pow-R-Ditcher line.

*Some Excellent Sales Territory Available*

VERMEER MFG. CO.

PELLA, IOWA

"Well built machine and a fast digger" says Jay Cundiff.


## SALES AND SERVICE . . .

**Continued**

the Business and Defense Services Administration, U. S. Dept. of Commerce, was announced recently. Halderman will head the division for six months. The General Components Div. is the Dept. of Commerce's unit for handling problems affecting manufacturers of machinery and equipment parts.

### Special Mention

**Worthington Corp.:** The Holyoke, Mass., works and the sales operations div. have been combined as the Holyoke div. William A. Finn has been named general manager of the new division.

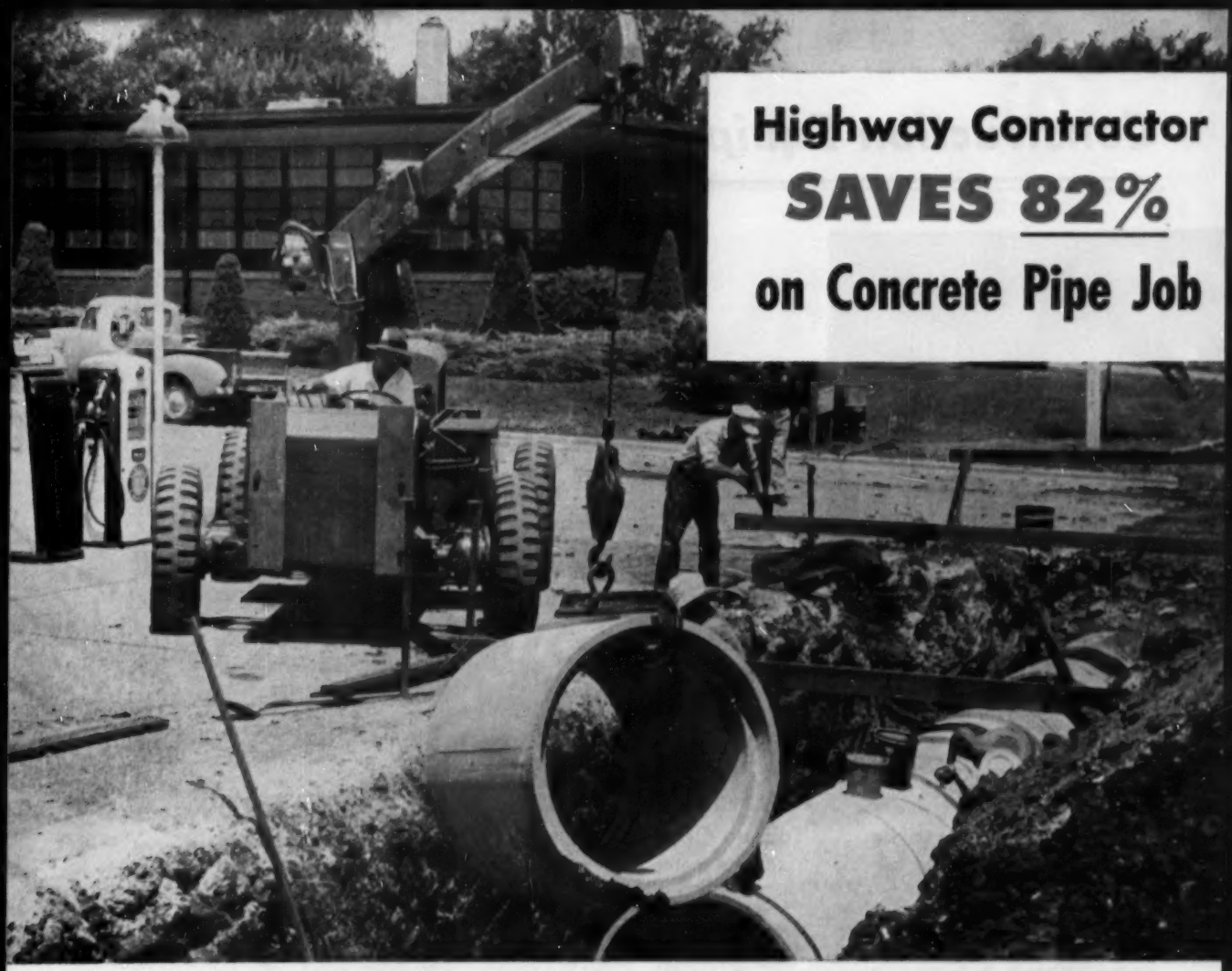
**Clark Equipment Co.:** A new subsidiary has been formed to consolidate export functions of the firm's operating divisions throughout the world. The new corporation, Clark Equipment International, C. A., is being organized under the laws of Venezuela.

**Kern Instruments, Inc.:** Copies of a new film showing the manufacture and application of Kern Swiss optical surveying instruments are now available on loan to interested groups. The film, photographed in Switzerland, is available with an English-language soundtrack. Surveying instruments are shown being used on airport, railway, highway and hydroelectric plant jobs.

**Ottawa Steel Div., L. A. Young Spring & Wire Corp.:** Purchase of the assets of the Tracto-Lift Co. of Kansas City, Mo., has been announced. The principle product manufactured by Tracto-Lift is a heavy-duty fork lift truck specially designed for outdoor use in moving materials over rough or muddy terrain. It will be manufactured at Ottawa's home plant.

**Baldwin-Lima-Hamilton Corp.:** McClure Kelley, president, recently announced that BLH will dissolve four subsidiaries and bring them more closely into the nation-wide organization as divisional units. The companies are Austin Western Co., Aurora, Ill.; Hydropress, Inc., NYC; Pelton Water Wheel Co., San Francisco; and the O. S. Peters Co., Washington, D. C.

**Oster Manufacturing Co.:** "Portable Parade" is the title for a 20-min color film dealing with the proper selection and use of portable pipe threading machines, both in the shop and on the job. The film will be lent out by Oster to trade associations, vocational classes, foreman groups, etc. In addition, the film is cleared for television use. Bookings will be made on a first-come-first-served basis.



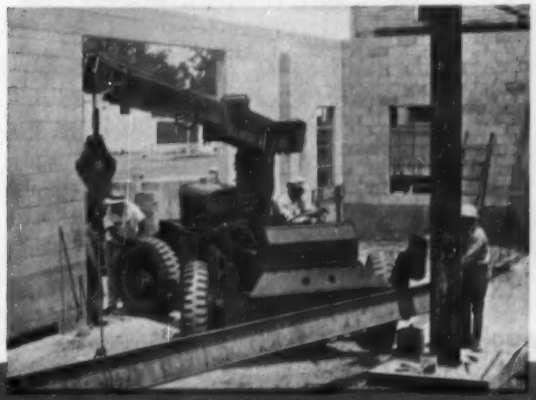
# Highway Contractor SAVES 82% on Concrete Pipe Job

# AUSTIN-WESTERN HYDRAULIC CRANE

## Handles Work of 7 to 10 Men

**R. S. Houge, Registered Professional Engineer, Springfield, Mo. says:**

"Unique design permits use in locations where no other crane could operate."



"... Capable of 20 mph on the highway, this crane requires no loading and expensive transport."

"I never made a better purchase and at the end of six months paid off the balance."

"...This pioneer acceptance of the A-W Hydraulic Crane paid off to the tune of many thousands of dollars."

"No larger crane could have handled these loads beneath high tension wires of the overhead long distance transmission lines."

"...This was within practically one week's cost of returning 100% on our investment."

"We remember one particular day on which we laid 492 feet of 30-inch pipe in eight hours, after carrying approximately half of it a distance of from 300 to 500 feet."

"... It can easily handle 10,000-pound 66-inch four-foot sections of concrete pipe."

"Instead of three men installing one bracket a day, he himself installed six brackets each day at a cost of $14 apiece, as against his $80 bid."

"...We haven't spent a cent for repairs in its first 11 months use."

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# Construction Equipment News . . .

## Compact and Versatile

Powered by gas engine or electric motor instead of a compressor, the Pinazza demolition hammer, shown driving spikes, delivers 1,800 blows per min. Flexible shaft transmits power.—**Pitnam Industrial Products Co., 608 5th Ave., NYC.**

## Torque Converter Graders

Two new motor graders featuring torque converters and power shift transmissions—the 140-hp 7-D, above, and the 100-hp 6-D—offer more usable power, increased ease of operation, and hydraulic booster steering that retains the feel of manual steering. A powered moldboard operated hydraulically is standard on both models. Big 14:00x24, 10-ply tires on the 7-D and 13:00x24, 8-ply tires on the 6-D account for good traction.—**Huber-Warco Co., Marion, Ohio.**

## Redesigned Payscrapers Offer Increased Capacities

Redesigned bowls that increase heaped capacities and lower draft frames that improve operator visibility are among features of the improved International self-propelled scrapers. The redesigned Payscrapers are the 262-hp model 75, above, with a heaped capacity of 20 yd and the 172-hp 55, with a 14-yd heaped capacity. Other changes include higher apron lifts, bigger push blocks, improved ejectors, and a new "cerametallic" clutch on the 75, said to insure longer wear with less adjustment. Both scrapers are powered by Cummins diesels.—**International Harvester Co., 180 N. Michigan Ave., Chicago, Ill.**

## Integrated Blade and Roller

A strike-off blade is supposed to prepare fill for the roller, so why not bring them as close as possible? The Bros blade, mounted directly in front of the roller, has a ½x6-in. reversible cutting edge. Power take-off from the tractor hydraulic system allows the blade to be adjusted through 7½ in.—**Wm. Bros Boiler & Mfg. Co., 1057 10th Ave., Minneapolis, Minn.**

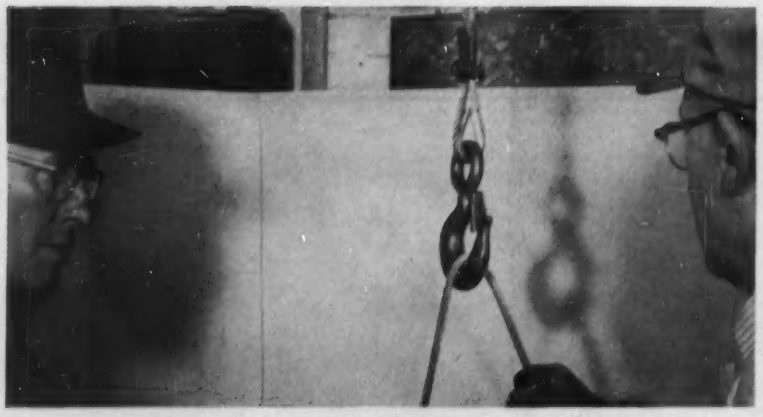
## Four-in-One Attachment

The 2½-yd Drott skid shovel attachment for the International TD-14 is easily converted to a bulldozer, clamshell or bullclam by hydraulic action. As a skid-shovel the unit has a break-out force of over 17,000 lb, and 42-deg bucket roll-back. It will dump with a 9-ft clearance. As a bulldozer it has a 94-in. cutting edge.—**Drott Mfg. Co., Milwaukee, Wis.**

## Push Rubber with Rubber... and Power

Great power and high speeds are combined in a new rubber-tired pusher designed to handle the biggest scrapers available today. LeTourneau-Westinghouse's Twin-C pusher offers two GM 6-71 engines with a total of 416 hp, twin constant mesh transmissions and torque converters, big 29.5x9, 29-ply tires, and speeds up to 20 mph forward and 5.8 mph in reverse. Le-Tourneau-Westinghouse is calling the big unit, which weighs more than 80,000 lb, the heaviest, the most powerful, and the fastest push-tractor in the field. So that all this power can be put to its best use, the pusher is equipped with a 49½x88-in. floating

(Advertisement)



## SAFETY HANGS BY A HOOK

It's small and relatively inexpensive, but a hoist hook carries the full load —as much as a crane is designed to handle! All hooks may look similar, but Laughlin hooks offer a combination of features that make them outstandingly safe. First, they are forged from special bar quality steel, then accurately heat treated; finally, Laughlin's precision die design controls the metal's grain flow during forming to keep the elastic limits of the hooks at their proper ratings.

Next time you need hooks remember that *safety hangs by a hook*—and Laughlin hooks are the safest!

### THE RIGHT COMBINATION

An exacting combination of design, steel and drop forging goes into Laughlin Shackles. A combination that results in maximum strength without brittleness that can result in fracture under shock load or in extreme cold! Pins used in Laughlin Shackles are forged from the same high quality steel —their extra hefty design makes them safer when shock loads accidently occur. When you see the famous Laughlin trade mark on shackles (and all other Laughlin fittings), you're seeing the mark of safety! Your nearby Laughlin Distributor has shackles in sizes from 3/16" to 3".

½" chain to rings, end and sling links, eye hooks, pad eyes, tractor eye bolts and other fittings.

The world's most complete line of fittings for chain and wire rope is described in the catalog available from your Laughlin Distributor, or Thomas Laughlin Division, American Hoist & Derrick Co., Portland, Maine.

### LAUGHLIN LINKS INSTALLED QUICKLY

Lower downtime—fast changeover is reported by companies using super safe Laughlin Double Clevis Links to couple standard and alloy chains to fittings. Users everywhere have cut out expensive, time-consuming welding and blacksmithing in favor of simple installation. Laughlin's heat treated Double Clevis Link attaches ¼" to

### SAFETY IN SIGHT

Ever worried about your crew forgetting the rated capacity of a block? You're free from worry and they're free from danger with Crosby "Load-Rated" Blocks because the load capacity is *embossed* in the side plates! A quick glance shows what the limits are —no chance to overload the block by mistake. Crews the world over are protected by Crosby "Load-Rated" Blocks —are yours? Crosby Products Division, American Hoist & Derrick Co., St. Paul 1, Minnesota.

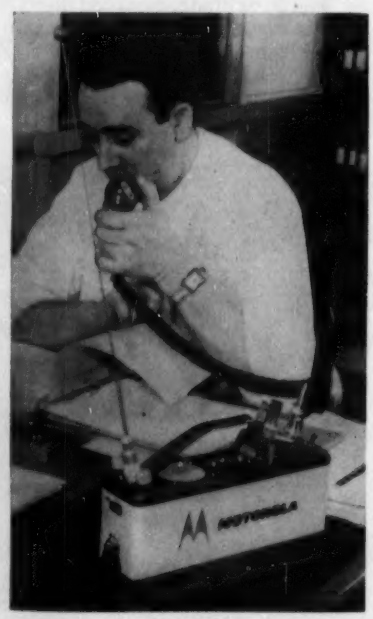


pushplate that enables the operator to feel the load and determine the best position for effective pushing. Electric controls power the movement of the push-bowl and also provide positive power steering.

Speeds of the pusher are matched to the most common loading speeds of rubber-tired earthmovers so that the maximum power of the scraper prime mover can be utilized during loading. Because of its high forward and reverse speeds, the pusher is quick to position itself behind the next scraper to be loaded.

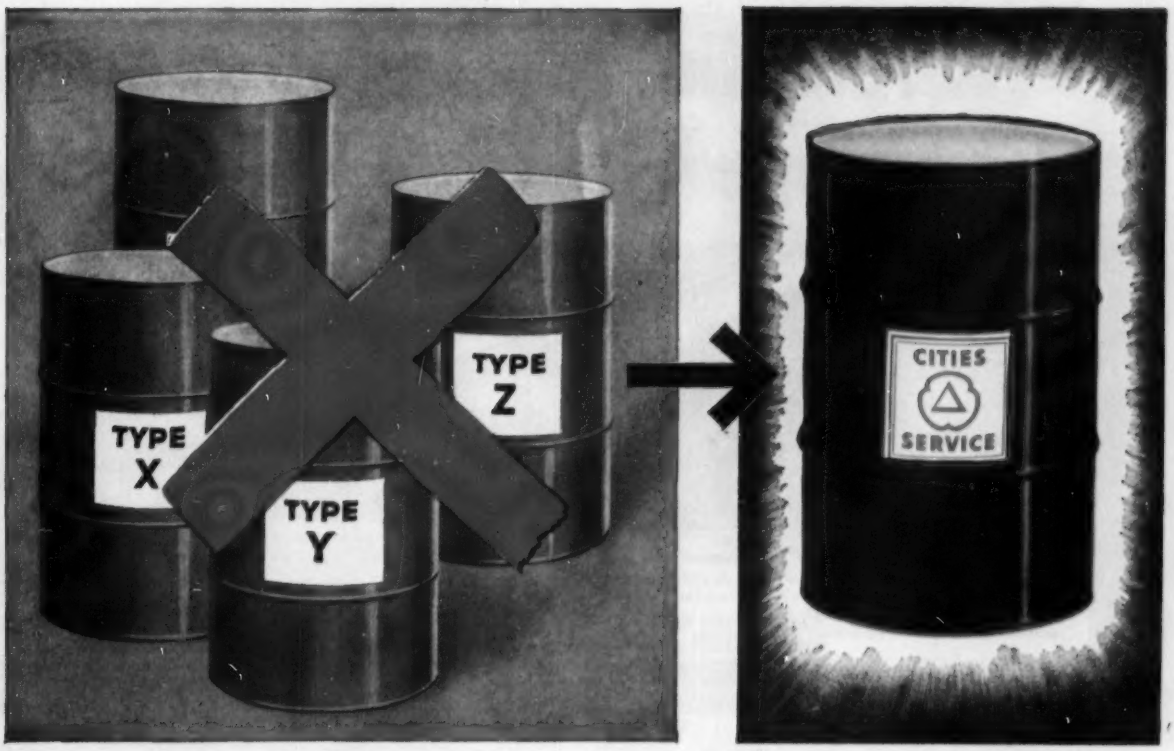
Most of the components and assemblies that make up the new pusher are taken from the C Tournapull. Among these are the transmissions, torque converters, and differentials that are teamed in the new unit.

The twin C is 28 ft, 10 in. long with the pusher bowl, 9¾-ft wide, and 11 ft high. The wheelbase is 15 ft. Maximum turning angle is 60 deg left or right and the width required for a 180-deg turn is 43 ft, 8 in. Ground clearance is 18 in. Four-wheel multiple disk air brakes provide 3,762 sq in. of braking surface.—**LeTourneau-Westinghouse Co., Peoria, Ill.**



**SMALL COMMUNICATORS**—By using small transistors and aluminum housings, Motorola has succeeded in producing a line of portable radiophones that weigh from 7 lb, 9 oz to 15½ lb for the 8-w model. Another feature is the "snap-

*(Continued on page 223)*

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New Multi-Purpose Trojan H not only has greater stability than previous greases, it also pumps easier at low temperatures, flows easier, and has exceptional resistance to water, oxidation, and rust. Best of all, it lasts longer and tests show it takes *less* to do this superior job of lubrication. Result: You save time, confusion, and money!

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**World's Longest Highway Bridge Is Prestressed Concrete.** The roadway of the Greater New Orleans Expressway crossing Lake Pontchartrain is being layed with concrete slabs 56 feet long and 33 feet wide precast with curb and gutters and prestressed with 175 separate Tufwire Strands.

# Prestressed Concrete is a "Comer" with Adaptability Unlimited...

Almost anything that concrete will do—it will do better when prestressed. As a matter of fact, prestressed concrete may be used in sections which are not possible with reinforced concrete.

It is structurally sounder because the compressive stress imposed by prestressing cancels out tensile stresses against which concrete is inherently weak. Tension cracking is minimized.

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The designing of prestressed members is not difficult when based upon a fundamental knowledge of the strength and mechanics of materials. Many experienced designers and engineers now offer dependable consultive service to firms who have or are about to enter into the most promising business in the construction field — the manufacture of prestressed concrete products.

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Prestressing offers opportunities not only to on-site contractor, but also to the permanent site fabricator of concrete products of every description. We can put you in touch with reliable engineering and design consultants. Our engineers will work closely with you on your stress relieved wire and strand specifications.

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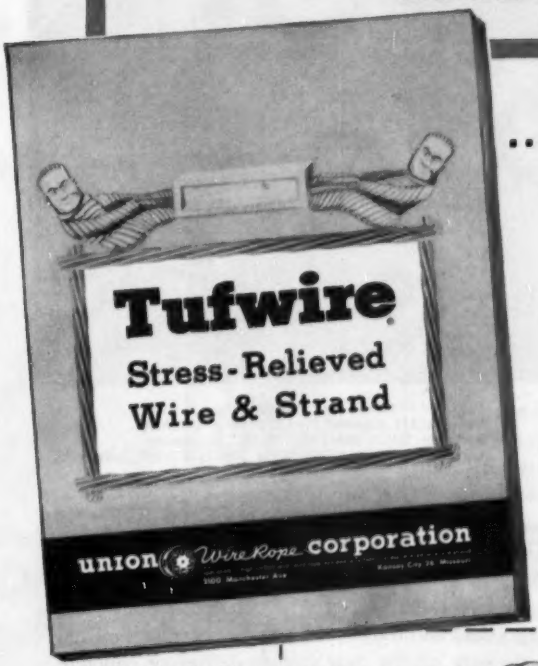


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**The jobs don't come** too big or too small for on-schedule supply of Union Tufwire (Wire or Strand) —whether it's for the world's longest highway bridge (pictured above) or a one-story building. Even though the demand for Tufwire has taken mighty big strides ahead, we stay ahead of present demand, and we're geared for the future.

**The research and production** facilities of Union Wire Rope Corporation have been geared to the seven-league strides of prestressed construction since the trend began shaping up some ten years ago. Our expanding plant capacity and central location in Mid-America have made us the ideal source of supply for the strand and wire that form the "tendons" of prestressed concrete.

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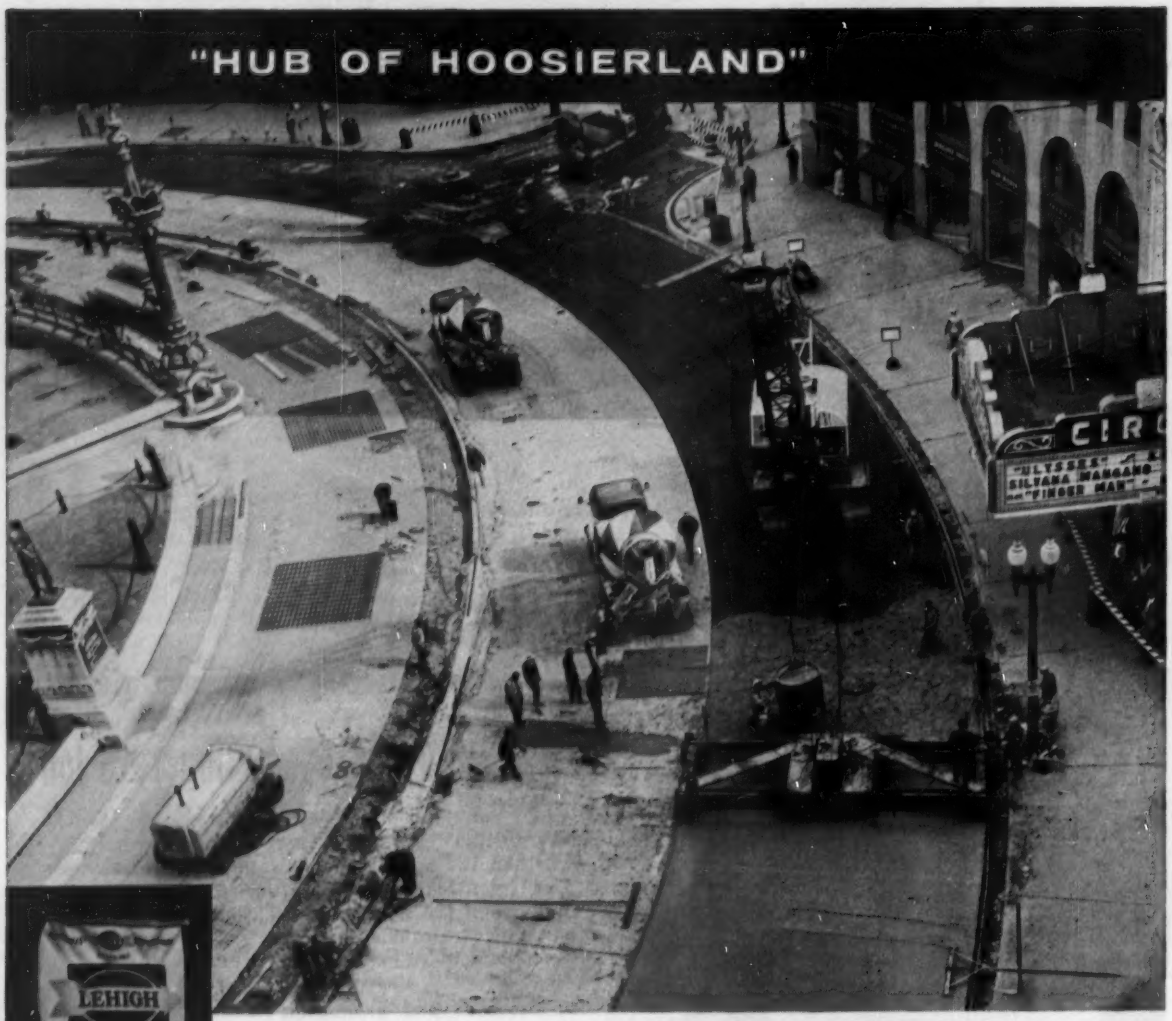


Monument Circle, mid-town Indianapolis
Owner: STATE HIGHWAY DEPARTMENT OF INDIANA
Contractor: SMITH AND JOHNSON, INC., Indianapolis
Concrete supplied by: READY MIXED CONCRETE CORP., Indianapolis

## Repaved **FAST** with Lehigh Early Strength Cement

Famous Monument Circle in Indianapolis needed repaving . . . with long life, low annual cost material . . . in the shortest possible time with the least inconvenience to the public.

This was accomplished through careful planning, fast modern construction methods—and the use of durable quick-curing concrete made with Lehigh Early Strength Cement.

For example, three days after a pour—less than half the usual time—heavy transit mixers were on the new section delivering concrete for the next pour. And in spite of bad weather throughout the job, the contractor saved seven days construction time.

Right for repaving the "Hub of Hoosierland," Lehigh Early Strength Cement may be *right* for your next job.

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• LEHIGH AIR-ENTRAINING CEMENTS • LEHIGH MORTAR CEMENT

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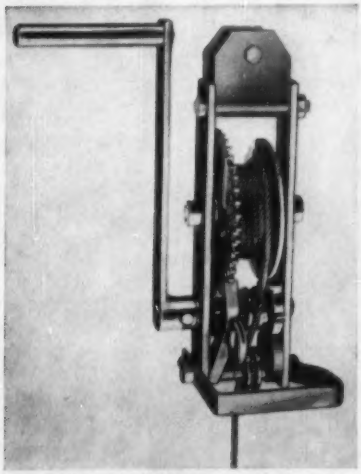
ALLENTOWN, PA.

on" power pack. Dry cell, wet cell and 117 VAC power packs are interchangeable. The wet cell power pack employs rechargeable nickel-cadmium cells and operates from either 6 or 12-v batteries. The line includes models with both handset type microphones and speaker type microphones.—**Motorola Communications and Electronics Div., 4545 W. Augusta Blvd, Chicago.**

**NEW MIXER**—The 7-yd Rocket 65 truck mixer features as standard equipment hydraulically operated chute control, permanently attached chute and a heavy-gage aluminum detachable extension chute, and an electric revolution counter kit. A choice of industrial engines is available for the new Rocket, shown here mounted on a Mack chassis. Other Rocket models are of 3, 3½, 4½ and 5½-yd capacity.—**Concrete Transport Mixer Co., 25 S. Bemiston Ave., Clayton 5, Mo.**



**SAFETY WINCH**—A new safety scaffold winch incorporates a patented escapement pawl that permits the operator to raise the scaffold as fast as possible but limits lowering speed to 30-40 rpm. When the handle is turned faster during the letdown, or if the operator lets go, the patented "Cam-Lock" feature stops it immediately. A 3/16-in. galvanized steel cable replaces troublesome lengths of rope. Sliding cable roller-guides turn on zinc plated shafts of the double sheave feed to prevent uneven spooling and unspooling. The 500-lb capacity single-line winch has a 50-ft drum capacity. It weighs about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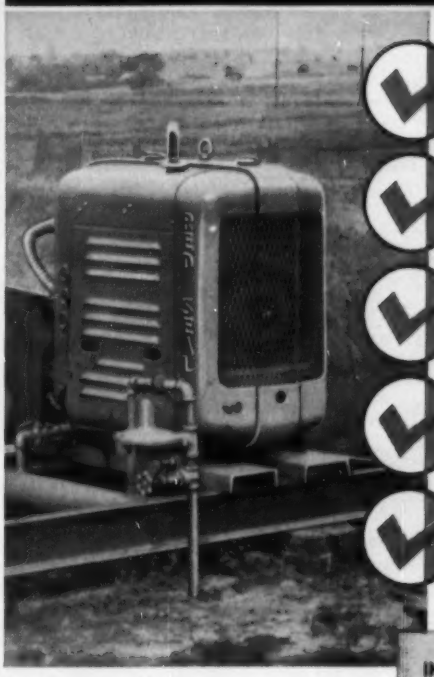

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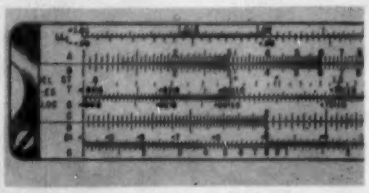
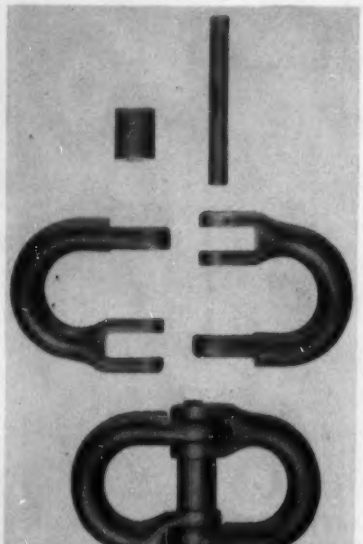
1252 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GA.

10 lb without bail and cable.—**Sasgen Derrick Co., Dept. CML, 3123 Grand Ave., Chicago 22, Ill.**

**PACKAGED TRANSMISSION**—The new Allison Powermatic transmission, designed for 15 models of Chevrolet 2-ton highway trucks combines in one package a power shifting heavy-duty transmission with six speeds forward and one reverse plus an integral hydraulic retarder for braking action. The retarder is said to provide a force up to six times greater than that available by engine braking. The retarder is located in series with the gear train and is operated by a pedal located in the conventional clutch pedal position. Push the pedal and a vaned chamber cavity of the transmission is oil flooded, offering resistance to blade rotation that retards the drive shaft. The single stage torque converter operates as a hydraulic torque multiplier. When the vehicle reaches a speed where the torque converter contributes no further multiplication, it automatically locks in each of the six speeds. This is said to provide fuel economy. The planetary gear system, composed of a basic gear set consisting of low, intermediate, high and reverse, is preceded by a splitter set that gives the six closely spaced forward speeds.—**Allison Div., General Motors Corp., Indianapolis 6, Ind.**



**LIGHT-ALLOY SLIDE RULE**—The Eye-Saver slide rule offers the slipstick user two important features. The light alloy rules are non-corrosive and unlike wooden rules cannot pick up moisture from humid air. The manufacturers also claim that because the rules are made of metal they can calibrate them to seven decimal places and guarantee their accuracy. The Eye-Saver rule is colored yellow-green, since only the yellow-green rays focus exactly on the retina. White or other colors reflect all colors of the spectrum. The yellow-green color makes it easier to read fine calibrations without blurring and eyestrain.—**Pickett & Eckel, Inc., 1109 S. Fremont, Alhambra, Calif.**



**COUPLING LINK**—The Hammerlok link consists of a pair of body halves, a tubular stud and a hardened alloy steel pin. It can be assembled in seconds to make up new slings or special assemblies without having to order new assemblies from the factory. Once assembled, it is securely locked by the steel pin that bites into the steel stud. No peening or welding is required and the link can be disassembled and re-used. The links are forged from alloy steel and are heat treated. According to

MILLER "B" 10 ton $1175*
F.O.B. Milwaukee
Any optional equipment extra
*Plus Freight and 8% Federal Tax

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Shuttling tractors from one job to another with a MILLER Tilt-Top is so easy, so fast . . . it can put more dollars in your pocket every day! One man can tilt, simply drive the equipment onto the broad, oak decked platform, be on his way in *less than two minutes!* This fast loading and unloading, precise, easy backing, on-a-dime maneuverability, cuts time between every job . . . steps up productive time for men and machines! That's why MILLER Tilt-Tops' equipment shuttling cover more jobs with one tractor . . . can often save duplicating expensive equipment.

For hauling dozers, rollers, trenchers, shovels and other heavy equipment there are a variety of single or tandem axle Tilt-Tops or low beds. All are equipped with Timken roller bearings, massive "EDG-SUPPORT" frames and 2" oak deck platforms!

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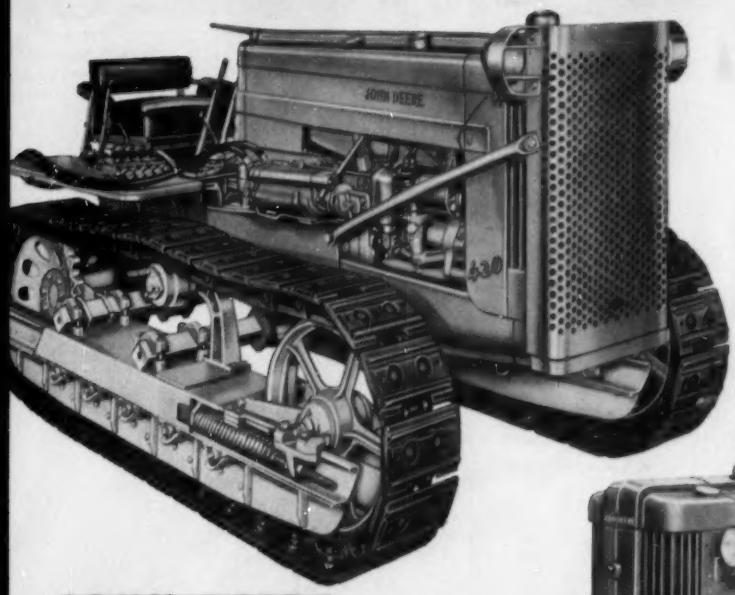

### JOHN DEERE CRAWLER

**A "little giant" in its work capacity. Weighs between 4 and 5 thousand pounds, depending on equipment. Develops approximately 25 horsepower on the drawbar. 4- and 5-roller sizes. Choice of track shoes.**

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**The "handyman" wheel-type tractor of a hundred-and-one uses. Low-built. Highly maneuverable. 3-point hitch regular.**

EVERYWHERE . . . on many types of work . . . the John Deere Crawler and the John Deere Utility are making good in a BIG way with profit-minded contractors and industrial users.

Both models are built around the highly efficient, economical, and dependable John Deere engine. (The word economy is not used loosely. Owners' reports average less than *one gallon of gas per hour* on all types of work!)

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And here is the simplicity and accessibility you want for ease of servicing which spells LOW-COST MAINTENANCE throughout the long productive life of a John Deere Tractor.

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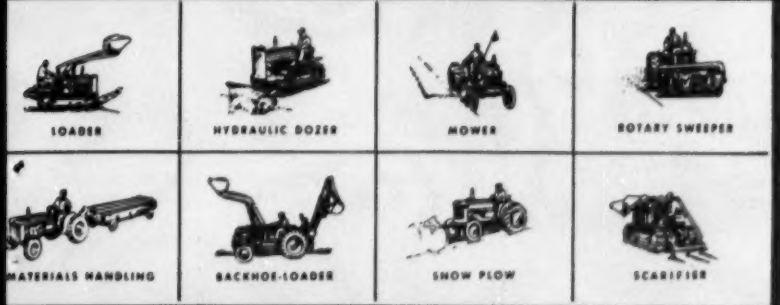


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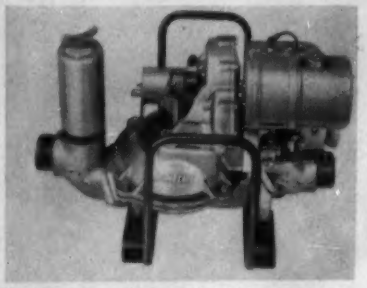
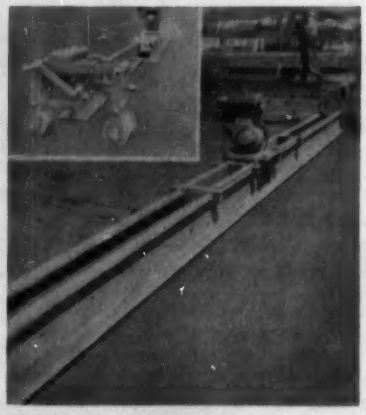
## EQUIPMENT NEWS . . . Continued

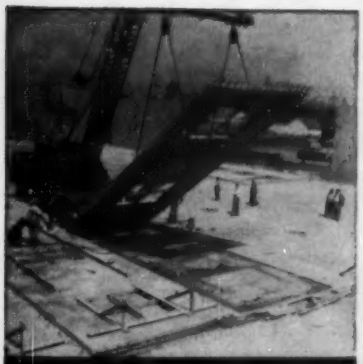
the manufacturer, they are stronger than the alloy chain sizes they are designed to join. Various sizes are available. — **Columbus McKinnon Chain Corp., Tonawanda, N. Y.**



**HOMELITE PUMP**—With a pumping capacity of 5,000 gal per hr, the Model 20DP3 diaphragm pump can handle mud, muck and sand as well as water. Easy to carry and move around, the pump weighs only 120 lb. The 20DP3 runs six hours at full capacity on only one gal of fuel. Powered by a Homelite single-cylinder, two-cycle gas engine, the pump has a throttle on the carburetor that can be regulated to adjust engine speed for different pumping conditions. At full throttle the pump makes 63 strokes per min. According to the manufacturer the pump has a suction lift of 28 ft and total head of 50 ft, including friction. Supplied with 3-in. fittings, the 20DP3 can be adapted for use with 2-in. hose.—**Homelite, 75 Riverdale Ave., Port Chester, N. Y.**



**TELESCOPIC SCREED**—By simply loosening several bolts the shoe-plate and rigid main frame of a new vibratory screed can be telescoped to any desired shoe-plate contact from 22½ ft to 36 ft wide in fractional inch increments with one set of beams and from 15½ ft to 23 ft with a second set. Both beam sizes fit the same end-trucks and engine mounts. The screed is quickly adjusted to prevent the shoe-plate from riding on the forms. Because of its telescoping feature, which



PRECAST PANEL 32' high, 18½' wide with two large window areas

TRUSS has 60' span at top

114,000 LB. SLAB being positioned

PANEL with door and two window areas

# SUPERIOR

## Complete Accessories Plus Experience on Tilt-Up Jobs!

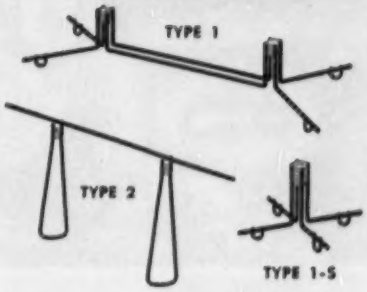
On every Tilt-Up job the proper type of Pick-Up Inserts and Brace Anchors as well as their location in the slab or precast structural member are of prime importance in order to withstand the stresses occurring when *tilting, lifting,* and *positioning.* As pioneers in this field, SUPERIOR has developed various types of accessories and correct procedures resulting from the experience of thousands of job applications.

SUPERIOR accessories are designed for fast and efficient handling of all types of precast panels and structural members. The Pick-Up Insert provides dependable anchorage for bolts which secure a lifting angle to which slings are attached when the panel is raised. Brace Anchors secure the temporary bolts by which the Braces are attached. The exclusive pivoting action of the adjustable Braces permits quick positioning and alignment of panels. Braces are assembled with 2 x 4's or pipe of lengths to fit job conditions.

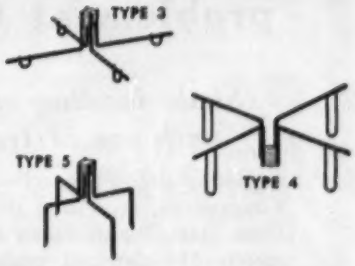
The many types of SUPERIOR Inserts, Anchors, and Braces for every job condition together with complete layout service provide a combination which offers safe and efficient handling of precast panels and structural members.

*For further details refer to Sweet's Catalog or send for BULLETIN TU-3.*

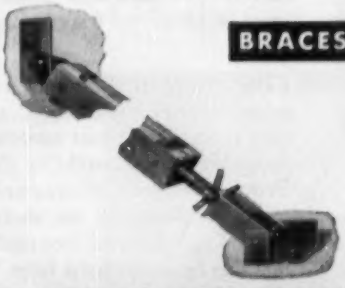
**PICK-UP INSERTS**




**ANCHORS for BRACES**




**BRACES**



**SUPERIOR CONCRETE ACCESSORIES, INC.**

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St., San Leandro, Calif.

# Trench hoe solves difficult problem at Oahe Dam

## *Shale loading speeded up with use of trench hoe*

Ingenuity always pays off — as it is for Pierre Constructors, excavating the stilling basin at Oahe Dam, Pierre, South Dakota. Approximately 114 thousand yards of tough shale must be excavated for construction of the huge basin.

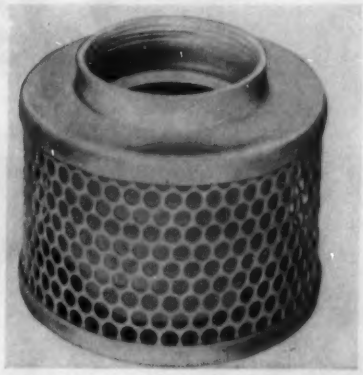
Early phases of this excavation were handled with a shovel but Pierre Constructors realized that precise side wall cuts and accurate grade levels were not feasible by this method. H. B. Bruce, Project Manager for Pierre Constructors, pioneered the thought that a Manitowoc 1¼ Yd. trench hoe could do the job. The hoe has been operated from above and to the sides of the cuts and has not been confined to operation into the face of the excavation as a shovel would be. The results speak for themselves. More yardage has been removed and more important, accurate grades and precise faces have been maintained throughout the project.

Boom stiffness, unusual stability, and power to spare allow this hoe to work from any position and excavate shale without the need of blasting. The versatile Manitowoc uses a maximum of four passes in two minutes time, loading 6 Yd. trucks. Smooth torque converter drive plus air controls enable the operator to handle anything the bucket encounters with ease.

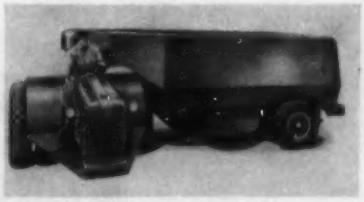
### HOE HAS MANY OUTSTANDING FEATURES

This sturdy Manitowoc Hoe can dig down to 25'6", reach out 38' and can dump into the trucks with ease at any loading level. Extremely mobile, the 1¼ yd. Model 2000 can be moved as easily as a small machine. The counterweight is self-removing, enabling the hoe to be trailer moved across country — from job to job — and of course can be easily converted to shovel, crane or dragline as the operation requires. Full information on this unit, as well as sizes ranging up to 5½ yd., may be obtained from the MANITOWOC ENGINEERING CORP., MANITOWOC, WIS.

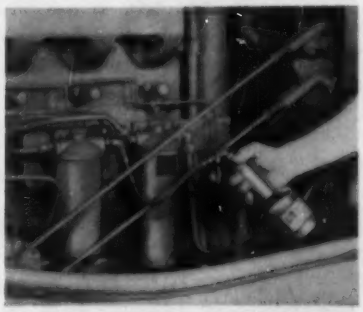
eliminates beam overhang, the screed can be operated in close quarters. Shock mountings at the end-trucks and engine mount protect both the engine and forms from the 10,200 vibrations per min developed by a 3.6-hp motor. — **Creative Metals Corp., 1290 Powell St., Emeryville, Calif.**



**PUMP STRAINER**—The screen of Stolper Steel Products Corp.'s new strainer for construction pumps is small enough to insure against impeller damage, yet five times as large as the suction line. Round perforations reduce clogging and make cleaning easy. The flat, closed base prevents sinking in soft bottoms and an inside baffle maintains suction when the strainer is only half-submerged. The strainers, designed in close cooperation with leading pump manufacturers, are available for pipe sizes from 1½ to 6-in. dia.—**Stolper Steel Products Corp., Menomonee Falls, Wis.**



**DUAL COMPACTOR**—The Seaman-Gunnison Duo-Pactor combines two compaction methods in one machine. With the flick of a hydraulic switch, the operator can select either pneumatic compaction through eight oscillating, spring mounted wheels or rigid roll compaction through a 72-in. wide steel roller. The operator can also use both compaction methods at the same time. The Duo-Pactor, believed to be the first machine to offer two compaction methods, is drawn by a single axle International tractor equipped with four 4-ft dia drive wheels for maximum traction. Complete turn arounds, without backing, can be accomplished on 19-ft roads. The Duo-Pactor has a gross weight ranging from 6 tons to 19 tons with sand and liquid ballasting. When fully ballasted, the steel roller provides 425 lb of compression per lineal inch. Seaman-Gunnison is a new company formed by Ivor Gunnison, Donald J. Seaman and A. M. Seaman.—**Seaman-Gunnison Corp., 201 Lynn Ave., Baraboo 43, Wis.**

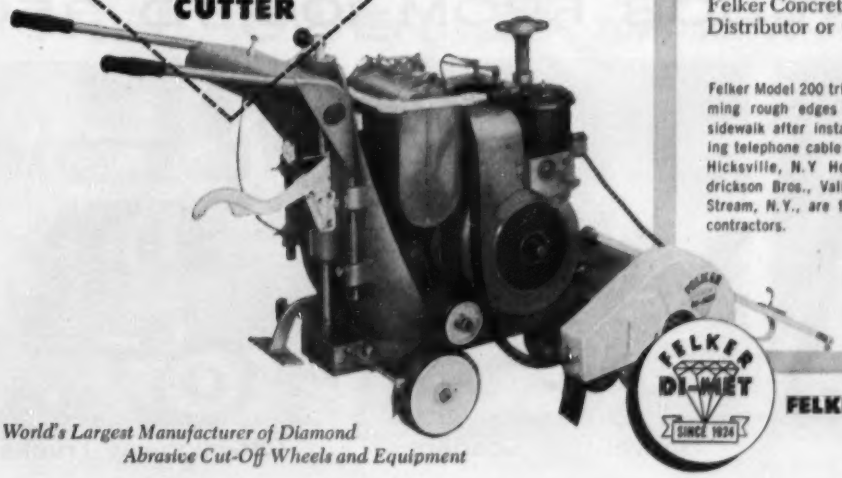


**DIESEL PRIMER**—The J 5956 Fuel System Primer for diesel engines prevents damage to fuel injectors, fuel injection pumps and nozzles that can result by attempting to start a newly overhauled engine before the fuel system has been adequately supplied. The primer is also said to

*(Continued on page 232)*


**If you saw only 10,000 feet per year this pays for itself!**

FELKER MODEL 200 CONCRETE CUTTER



**That's a fact!** If you pay 15¢ to 18¢ per foot for concrete sawing—a common price for contract work, you can buy a Felker Model 200, equip it with Felker blades and cover labor costs on just 10 days' cutting per year! Check your next years' program—See how much you can save by ordering this low cost machine!

Felker Model 200 is an all-around machine, small enough for good maneuverability, husky enough for heavy production jobs. 13.5 h.p. Wisconsin, hydraulic lift and downfeed to blade. Get our circular on the Model 200 and other Felker Concrete Cutters from your Felker Distributor or write direct.

Felker Model 200 trimming rough edges of sidewalk after installing telephone cable in Hicksville, N.Y. Hendrickson Bros., Valley Stream, N.Y., are the contractors.

FELKER DI-MET SINCE 1924

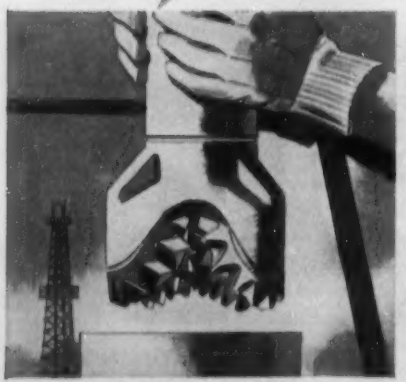
*World's Largest Manufacturer of Diamond Abrasive Cut-Off Wheels and Equipment*

**FELKER MANUFACTURING CO.**
Torrance, California

**NEW** *from Allison –*

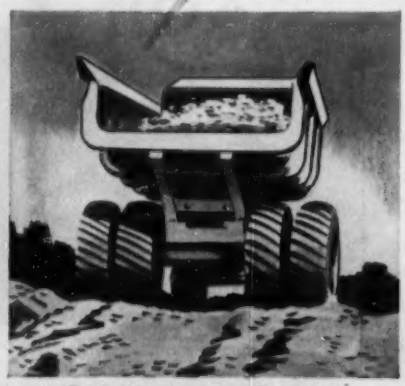
***The world's***

FOR ANY JOB FROM 100 TO 350



Drilling Rigs

Shovel-type Loaders



Off-Highway Trucks

# most versatile TORQUE CONVERTER

Now, from Allison, comes the world's most versatile torque converter—the Series 500 TORQMATIC—to give you more power over a wider working range and permit you to standardize on *one* type of converter for *all* your equipment.

In *one standard housing* it gives you a choice of 4 ranges, 7 torque ratios, 100 to 350 horsepower coverage.

It's available for practically any application—automotive, industrial or a combination of both.

And it's designed for rough, tough service in scores of fields—construction, mining, oil drilling, logging, materials handling—wherever gasoline or Diesel engines are used.

This new Series 500 TORQMATIC Converter embodies every engineering advance developed by Allison in building tens of thousands of TORQMATIC Converters over the past seven years.

In many applications it will permit the use of lower horsepower engines with no reduction in *working* power because it multiplies engine torque (true measure of an engine's *working* ability) from 250% to 360%.

And the new Series 500 TORQMATIC Converter will also permit engines to run in their best speed range—transmit more power in the high-speed range.

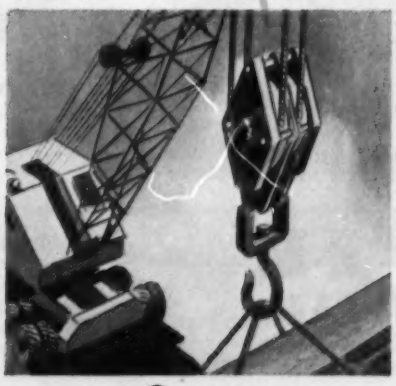
Soon you will be able to get the TORQMATIC 500 in scrapers, off-highway trucks, log loaders, drilling and servicing rigs, shovels, cranes, graders, industrial locomotives, ditchers and shovel-type loaders made by a score or more manufacturers.

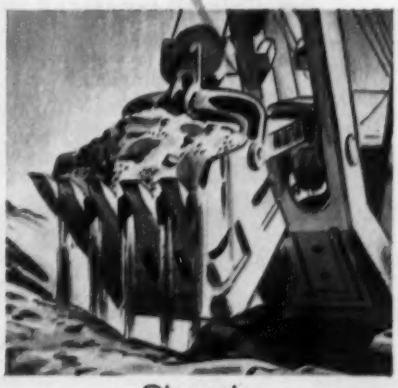
*For the names of these manufacturers and full details on the* TORQMATIC *Series 500 Converter write to:*

**Allison Division of General Motors**
Box 894T, Indianapolis 6, Indiana

HORSEPOWER GM TORQMATIC *Allison* TORQMATIC DRIVES

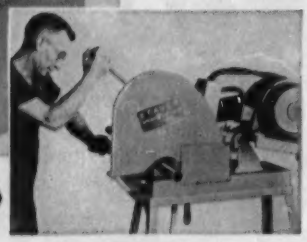
Graders


Cranes


Shovels

SAVE TIME! MAKE MONEY! . . . with
Beaver "Speed Cut"
Abrasive Cutting Machines

No. 20 Beaver "Speed-Cut" Abrasive Cutting Machine.



No. 14 Beaver "Speed-Cut" Abrasive Cutting Machine.

WOW! LOOK AT THESE CUTTING TIMES!

Cutting Time Chart—for No. 14 and No. 20

(Most users report less cutting time than shown).

| SIZE | MATERIAL | CUTTING TIME |
|---|---|---|
| 2 Inch | Steel Pipe | 5 Seconds |
| 4 Inch | Cast Iron Soil Pipe | 6 Seconds |
| 6 Inch | Steel Pipe | 40 Seconds |
| 2 Inch | Cold Rolled Steel | 20 Seconds |
| 4 x 4 x 3/8 Inch | Steel Angle | 12 Seconds |
| 4 Inch | Steel Channel | 10 Seconds |
| 2 Inch | Galvanized Pipe | 5 Seconds |

ONE MAN WITH A BEAVER SPEED-CUT CAN DO ALL THE CUTTING FOR A LARGE CREW!

- Greater power, more speed; Simply constructed . . . ruggedly dependable!
- Wheels changed in seconds!
- Fast, hold-down vise makes work insertion easy!
- Cuts all types and shapes; hard and soft materials!
- Patented, welded steel wheel guard provides absolute protection to operator!
- Moderately Priced!

Ask for information on the Beaver "Any Angle" Machine for cutting angles, the Wet Cutting Model, and Oscillating Head Model! Don't wait! Investigate Beaver Abrasive Cutting Machines NOW!

BEAVER PIPE TOOLS

Abrasive Machine Division

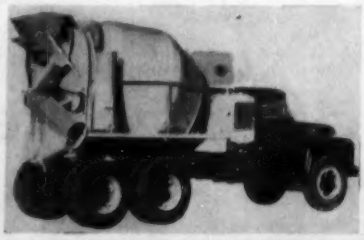
228-400 DANA AVENUE • WARREN, OHIO, U. S. A.


## EQUIPMENT NEWS...

Continued from page 229

reduce wear and tear on batteries and starting systems, especially in cold weather. Designed for easy attachment, the 1-qt capacity primer is applicable to GM Detroit Diesel engines and Buda Engines, among others.—**Kent-Moore Organization, Inc., 1501 S. Jackson St., Jackson, Mich.**

**WRECKER'S TOOL**—The Twin-Claw utility bar is a new hand tool that the manufacturer hopes will replace wrecking bars and crow bars on demolition jobs. Precision machined and heat treated, the tool consists of a 30-in. bar and a 5-in. twin-claw head that doubles as a nail puller. According to the manufacturer, the stand-up length makes it fast and easy to use, and because of its large twin-clawed head, nails come out straight without splintering forms and lumber. Suggested retail price of the tool is $4.95—**A & F Mfg. Co., 1423 28th St., Sacramento, Calif.**



**IMPROVED TRANSIT MIXERS**—An improved line of Westinghouse transit mixers in five sizes from 4½ to 6½ yd feature fully enclosed gear drum drives, two-speed transmissions, double-action mixing drums, and new swing-away chutes that permit direct discharge. The enclosed gear drum drive is an exclusive Westinghouse feature that cuts maintenance expense because there are no exposed gears or chains to wear out and break. The new swing-away discharge chute eliminates the

(Continued on page 235)

# NOW—Make your "CAT" a 3-Way Profit-Maker with an

# ATECO ROCK RIPPER

## for Caterpillar D9, D8, D7 and D6 Tractors

**1. Turn Former "Shoot & Shovel" Jobs Into Extra-Profitable Scraper Operations**... tractor mounted design applies tractor weight *plus* ripper weight to points for fast penetration in hardest materials. Exclusive curved shank produces underground "quiver" that makes rock-splitting points act like jackhammers to split and shatter rock into easy-loading condition, fast. Result? You can scraper-load many materials you'd otherwise have to "shoot and shovel"—at handsome savings in cost!

**2. Get Extra-Yardage Loads Faster, With Less Scraper Wear & Tear**... rock jobs aren't the only ones where ATECO rippers pay off. Whenever you hit cemented gravel, clay, mixed rock and dirt, packed or other hard-to-load materials, a few passes with an ATECO ripper will give you heaped scraper loads in a hurry, save you plenty on scraper downtime and repair!

**3. Increase Tractor Work-Power**... with an ATECO ripper behind and a dozer in front, your "CAT" is complete master of the cut—ready to rip, bulldoze or push-load, instantly. Ripper weight balances dozer, adds traction, improves handling. Tractor-mounted ripper works wherever the tractor can go, turns in its own length!

**SPEEDS TREE FELLING, LAND CLEARING, TOO!** Root knives available to cut 12" roots in a single pass—a few passes to cut supporting roots, a push with dozer or stinger, and even biggest trees go down in seconds!

**Why not get all the workpower you pay for out of your "Cat"? Make it a 3-way profit-maker with an ATECO ripper! See your Caterpillar distributor today to arrange a demonstration on your job, or write us now for literature and specifications.**

35

ATECO EARTHMOVING EQUIPMENT
Designed and Manufactured since 1929

Telephone SWestwood 8-2466
Available From Eastern Warehouse Stocks

DESIGNED BY Mack Wooldridge

AMERICAN TRACTOR EQUIPMENT CORP
9131 San Leandro Blvd. Oakland 3, California

BULLDOZERS • ROADBUILDERS • SCRAPERS • TAMPERS • RIPPERS • FARM IMPLEMENTS • FRONT LOADERS • HYDRAULIC PUMP • TANK & VALVE ASSEMBLIES

Bethlehem Hollow in use on Northeastern Extension, Pennsylvania Turnpike, drilling crews are encountering heavy going after area was hit by hurricane rains.

# They Moved 1½ Million cu yd of Rock For Turnpike Link Near Allentown, Pa.

Work on a closing link of the first forty miles of the Northeastern Extension of the Pennsylvania Turnpike was completed recently, south of Allentown, Pa.

The 14-mile stretch of 4-lane highway, in the picturesque Spinnerstown-Quakertown area, consisted of three separate contracts, all held by C. J. Langenfelder & Son, Inc., Baltimore. Bethlehem Hollow Drill Steel, 1¼ in. round and fitted with detachable carbide-insert bits, was used in jackhammers and wagon drills as they went to work on 1½ million cu yd of medium-hard rock. The blast holes were 12 ft and 18 ft deep, with about half of the drilling taking place in water and mud seams.

Bethlehem Hollow Drill Steel can be counted on for steady, low-cost drilling because it is rolled from a tough, fatigue-resisting steel. It has a wide quenching range, making it easy to heat-treat for the ideal balance of hardness and wear-resistance. It also makes long-wearing threads and tough shanks.

Bethlehem Hollow comes in rounds, hexagons and quarter-octagons, generally in lengths of 18 to 25 ft, though longer lengths can also be furnished. It's good drill steel to keep in mind for your next rock-removal job, big or small.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

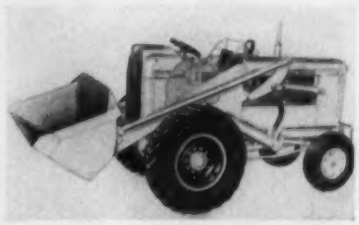
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

**BETHLEHEM HOLLOW DRILL STEEL** CARBON AND ULTRA-ALLOY

BETHLEHEM STEEL

need for removing and replacing the chute head when the truck mixer is discharging into high forms, hoppers or buckets. The operator merely pulls two pins, swings the chute out of the way, swings it back and relocks it in normal position. The double acting mixing drum has six auxiliary reverse mixing blades that give fast and uniform mix.—**Westinghouse Transit Mixer Div., Le-Tourneau-Westinghouse Co., Indianpolis, Ind.**

**PIPE BENDER**—Pipe bends up to 90 deg can be made in one setting of the pipe and one stroke of the ram with the new S-130 hydraulic pipe bender. The pipe bender's frame, swivel and bending shoes are made of lightweight aluminum. A removable top plate permits easy setting for pipe from ½ to 2-in. dia. —**Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee, Wis.**



**TRACTO-LOADER**—The 1⅛-yd TL-11 Tracto-Loader offers front-wheel drive for better traction and rear-wheel power steering for increased maneuverability. As with all other Tracto-Loader models, it has a 3:1 torque converter and a clutch-type transmission that permits changes in direction without gear shifting. At its normal carrying height of 3 ft the bucket tips back to a maximum angle of 41 deg. At ground level the bucket can be tipped back 22 deg. Maximum clearance under the hinge pin when in dumping position is 10 ft 3 in., and at this height the machine has a reach of 2 ft 7½ in. Over-all length of the TL-11 with the bucket in the carrying position is 15 1/3 ft. In this position the unit can turn in a 12¼-ft radius. Power is furnished by a choice of a 63 hp,


STERLINGS are my FIRST Choice because they LAST!

For STAMINA, long-lasting ruggedness, you can't beat Sterling Wheelbarrows. Users say they seem to last "forever". Work them hard, overtime, in toughest service . . . you'll agree Sterlings survive hard punishment . . . again proving . . .

IT PAYS TO BUY THE BEST.

*(Above)* Model D3½S Maximum Capacity 3½ cu. ft. 16 gauge tray, all welded, no rivets, double lapped at corners. Steel channel legs. V-shaped front braces and brace support.

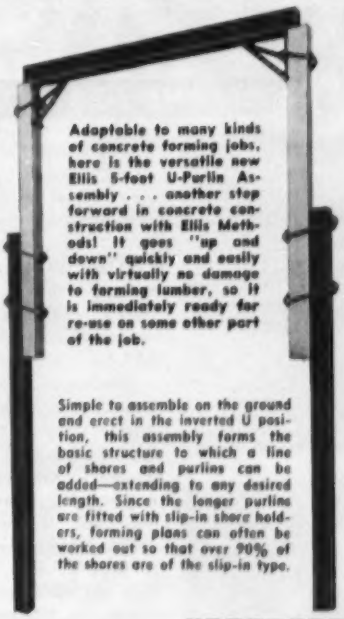
*(Right)* Model C5W Maximum Capacity 5 cu. ft. 16 gauge tray, all welded, no rivets, double lapped at corners. Heavy-duty malleable wheel guard.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling S WHEELBARROWS

ELLIS METHODS Now Offer New Shoring Simplicity With the 5-foot U-Purlin Assembly!



Adaptable to many kinds of concrete forming jobs, here is the versatile new Ellis 5-foot U-Purlin Assembly . . . another step forward in concrete construction with Ellis Methods! It goes "up and down" quickly and easily with virtually no damage to forming lumber, so it is immediately ready for re-use on some other part of the job.

The 5' U-Purlin, with a head clamp at each end, covers half the top of each shore slipped into the head clamp — leaving a ledge for the end of the next purlin.

Proof against slippage, the Ellis Clamp has a grooved pivotal plate that grips tighter as the shore load increases.

IMPORTANT NOTE: Ellis Shores are double-thick in the middle to make them extra resistant against buckling.

Component parts of assembly are: a 5-foot U-purlin with 2 head clamps attached, and a pair of standard Ellis Shores (each consisting of a 7-foot lower member with 2 clamps attached by threaded nails, and an upper dressed 4 x 4 member of desired length).

Simple to assemble on the ground and erect in the inverted U position, this assembly forms the basic structure to which a line of shores and purlins can be added—extending to any desired length. Since the longer purlins are fitted with slip-in shore holders, forming plans can often be worked out so that over 90% of the shores are of the slip-in type.

Members shown here as dark are standard painted Ellis woods, while members shown light are dressed 4 x 4's ordinarily furnished by the contractor.

Mail coupon at right or write for free suggestions on your structural plans to—

Ellis MFG. CO. INC.

211 N. W. 4TH ST., OKLAHOMA CITY, OKLA.

Send me more information at no obligation:

Name_____

Address_____

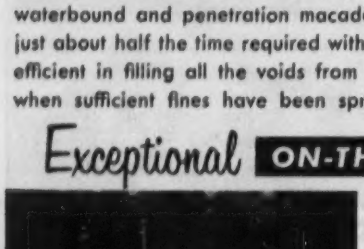
City_____ State_____

# 4200 TWO-TON BLOWS PER MINUTE!

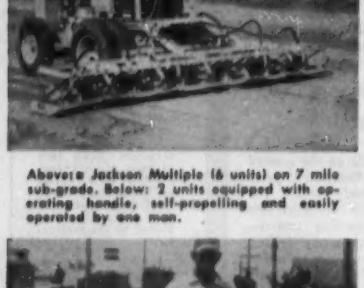
## Here's TREMENDOUS COMPACTION

. . . for rapidly and most economically achieving or exceeding specified densities in the consolidation of rock, slag, gravel and sand base courses in waterbound and penetration macadam construction. The Jackson does it in just about half the time required with equipment of other types and is equally efficient in filling all the voids from top to bottom of rock and slag courses when sufficient fines have been spread.

## Exceptional ON-THE-JOB ADAPTABILITY!



Above: a Jackson Multiple (6 units) on 7 mile sub-grade. Below: 2 units equipped with operating handle, self-propelling and easily operated by one man.

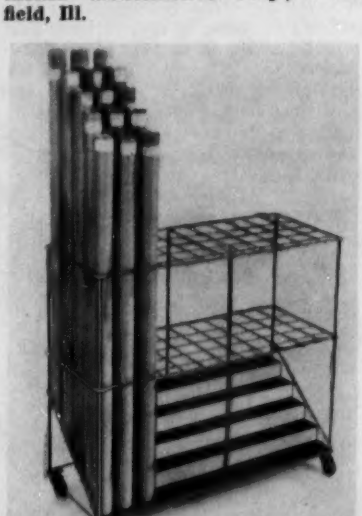


Standard width of the Jackson Multiple is 13', 3"; working speeds: up to 60' per minute; reverse: up to 5 MPH. Working width can readily be altered on the job to exactly suit narrower requirements such as widening projects. As many of the 6 compacting units as desired can be subtracted from the workhead, quickly and easily. Furthermore, easily interchangeable bases from 12" to 26" are available and individual compacting units may be fitted with operating handles and used exactly like the standard, highly popular, self-propelling manually guided Jackson Compactor. As a consequence Jackson equipment can be used on a great deal of work other machines cannot reach. If you have any job requiring compaction of granular soil, it will pay you to know specifically what Jackson Vibratory equipment will do. See your Jackson distributor. Literature and name of nearest Distributor on request.

**JACKSON**
**VIBRATORS, INC.**
**LUDINGTON, MICH.**




four-cylinder gas engine or a 77-hp, six-cylinder diesel. A 12-v electrical system is provided with the diesel model.—**Tractomotive Corp., Deerfield, Ill.**



**MAP RACK**—The Frontier Map Rack provides neat, orderly and compact storage of maps, blue prints, and other drawings. The racks have 2½-in. openings for individual filing of 60 maps in graduated steps to facilitate quick reference. The Map Rack requires little storage space since it is only 33 in. wide, 14½ in. deep and 32 in. high. Casters are permanently attached. — **Frontier Mfg. Co., P. O. Box 13266, 10600 Harry Hines Blvd., Dallas, Tex.**

**MASONRY SAW**—The head of Cardinal's new masonry saw may be raised or lowered to any desired fractional part of an inch within a 20-in. range. The unit features an adjustable regulator for hard and soft materials and a locking position for cutting on production runs. An electric motor develops 4.2 hp under

NSLEY WORKING NEAR YOU • THERE'S AN INSLEY WORKING NEAR YOU • THERE'S AN INSLEY WORKING NEAR
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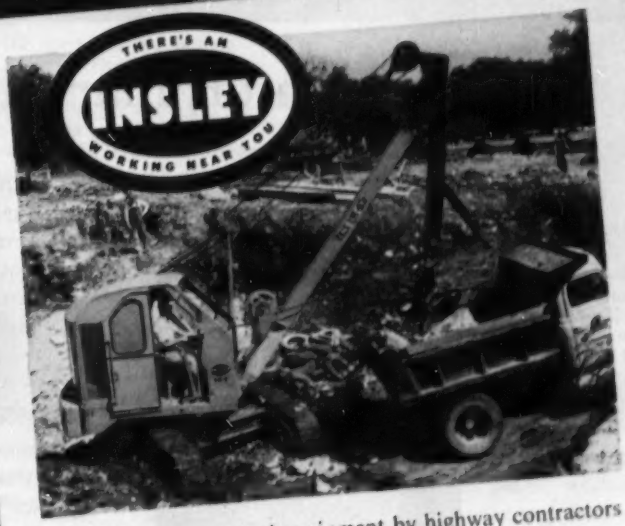


Recognized as standard equipment by highway contractors for excavating and trenching—Insley's proven design characteristics give the contractor a dependable machine—simple to service, easy to maintain. Insley's rugged dependability means minimum down-time and more production hours.

**INSLEY MANUFACTURING CORP. • INDIANAPOLIS, IND.**

***Wholly owned subsidiary / THE MAXI CORP. • LOS ANGELES***

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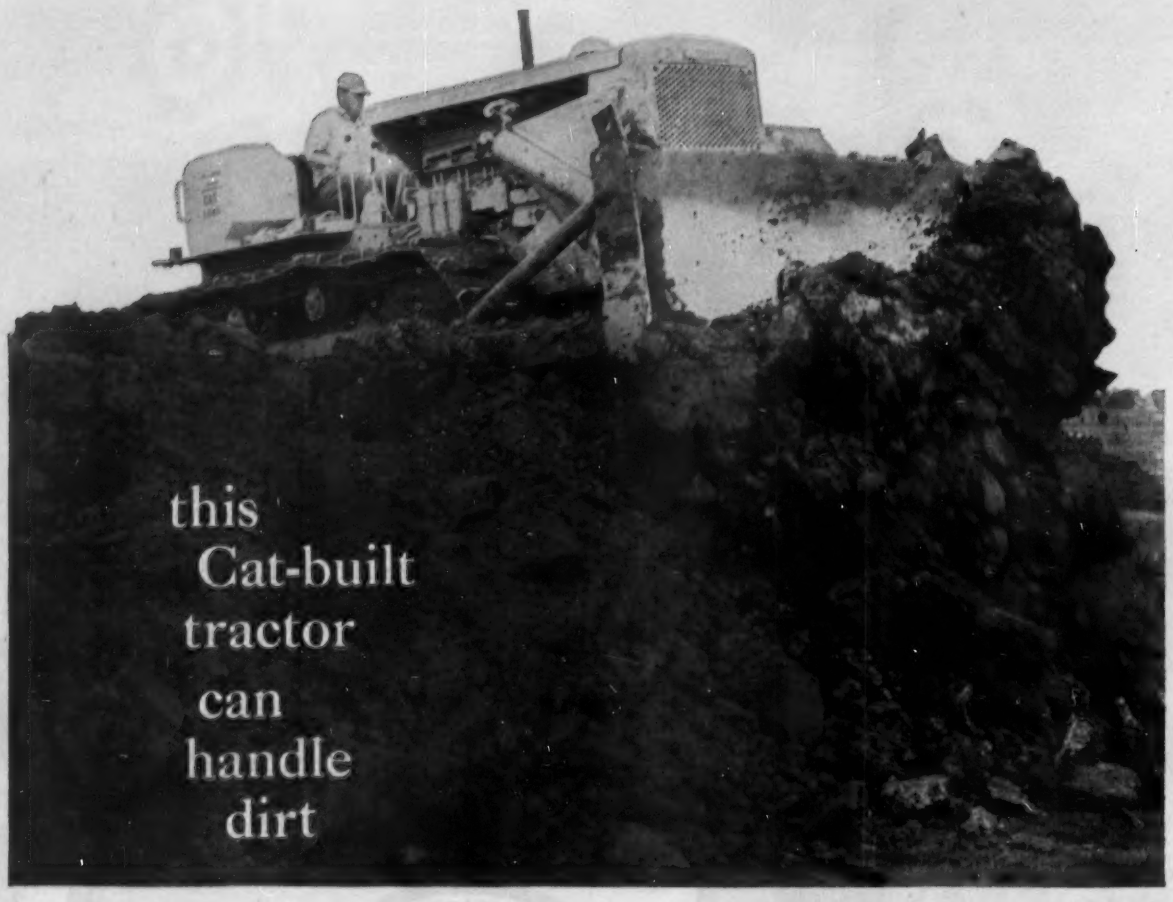



# . . . with Caterpillar filter refills

Your Caterpillar dealer well knows the damage that dirt-laden oil can do to your tractor. Precision parts can be ruined in a matter of hours if unfiltered oil gets into the engine. That's why he always insists on giving you Caterpillar replacement filters. Built to meet the specific requirements of your engine by Purolator, they can handle all the volume your Cat-built tractor requires . . . they never let oil "by-pass" the filter . . . never let harmful abrasives enter the engine.

It's common sense to do as your Caterpillar dealer does . . . insist on Caterpillar filter refills. The life of your engine is at stake.

PUROLATOR

"FIRST IN THE FIELD OF FILTERING"

PUROLATOR PRODUCTS, INC., Rahway, New Jersey, and Toronto, Ontario, Canada

CM
Lodestar®

ENTIRELY NEW
differently NEW

$149.50
and up

Built to serve you for its normal life without costly maintenance

... the first truly "heavy duty" version of the small electric hoist.

... complete flexibility—interchangeable suspension—quick voltage change.

FEATURING:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Fully Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

WRITE US
or call your CM distributor for literature, prices and quick delivery from stock.

CM
HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
Columbus-McKinnon Chain Corporation
Tonawanda, New York
Regional Offices: New York • Chicago • Cleveland
In Canada:
McKinnon Columbus Chain Ltd., St. Catharines, Ont.

## EQUIPMENT NEWS... Continued

load conditions. The saw is designed for wet or dry cutting on brick, block, refractory, tile and other types of masonry materials.—**Cardinal Engineering Corp., Philadelphia 27, Pa.**

**HYDRAULIC DRILL**—Designed as a core or auger drill, the B-40 can be adapted for tractors or vehicles, or can be independently driven by a motor mounted at the rear of a truck. For hard formations, either air or water may be used with hollow-stem augers. The drill cores to 200 ft and augers to 75 ft, according to the manufacturer. A 15-hp hydraulic motor is geared to high torque low speeds. One-man operated, it can be converted easily to drill at any deg in a 360-deg angle.—**Mobile Drilling Inc., 960 N. Pennsylvania St., Indianapolis 4, Ind.**

**NEW MOUNTING**—A new method of attaching shovel-crane turntables to crawler or rubber-tired mountings has been introduced by the Thew Shovel Co. Known as the Shear Ball mounting, it is said to eliminate the need for top or hook-type turntable rollers, center pins and nuts and exposed roller paths. The new mounting is said to result in more effortless swing with less power needed for swing operation, and lower maintenance and servicing costs. The mounting unit is a continuous circle of hardened steel balls, sealed in a precision-ground race that provides the means of at-

HOW TO HANDLE
WET JOBS

ADDITION TO
TELEPHONE BUILDING
Newport News, Va.
*Contractor: Wise Contracting Co.*

BOTTOM VERY UNSTABLE. Open pumping caused sheeting to collapse. View shows job shut down after second attempt to sheet hole.

WITH WELLPOINTS. Job is bone-dry, bottom firm and stable—Griffin Wellpoint system (see pumps, top of photo) holding ground water 3 ft below subgrade.

TIGHT FINE SAND with silty clay binder . . . precarious jetting conditions . . . "pinched-in" working space . . . these were only some of the problems. Griffin skills solved them all, speedily and economically.

GRIFFIN
WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.
In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

taching the turntable to the carrier. The outer race is machined on the inner diameter of the ring gear, which is bolted to the carrier. The inner race is attached to the turntable bed and the design is such that the balls interlock the two races and hold the turntable on the mounting. All vertical, horizontal, and radial loads are thus absorbed by alloy steel balls held by spacers. Because the balls are completely enclosed, normal lubrication is the only servicing required. The new mounting is available as standard equipment on two Lorain cranes, and is available as optional equipment on others.—**Thew-Lorain Thew Shovel Co., Lorain, Ohio.**

**BIGGER PAYLOADS**—A new line of front-mounted single telescopic hoists for use with 8 to 15 ft bodies is said to allow a substantial payload increase without violating highway weight laws. Called the Uniscopic series, the hoists allow payloads to be shifted forward to load the front axle to its legal limit because the new hoists lift at the front of the body. Payload capacities are said to range from 3 to 14 yd. Cylinders are three stage with either 5 or 6-in. first-stage sleeves. A high capacity roller bearing pump is designed to meet the oil volume requirements of the telescopic hoists. A spool-type control valve is built into the pump.—**Galion Allsteel Body Co., Galion, Ohio.**


# WISCONSIN ENGINE POWER

## at Work on the Ohio Turnpike

In building the Ohio Turnpike, a great variety of Wisconsin-powered construction equipment was employed, including sub-graders, automatic curing machines, compactors, spreaders, pumps, finishers, concrete saws and rugged, portable generators such as the Maginnis Model HG-4B-TF unit shown above, made by Maginnis Power Tool Co., Mansfield, Ohio. This unit is supplying power for two HCV-3 Maginnis Hi-lectric concrete vibrators, at work on a bridge abutment in forms up to 12 ft. deep. The generator is powered by a Wisconsin Model TF 2-cylinder Heavy-Duty Air-Cooled Engine.

On the rough, dirty jobs where heavy-duty serviceability is a "must", you can always depend on Wisconsin Engines to *come through* and keep the job moving. Standard features on all models, from 3 to 36 hp., include: self-cleaning tapered roller bearings at *both* ends of the crankshaft; impulse coupled high tension rotary *outside* magneto; pump-circulated lubrication and efficient AIR-COOLING at all atmospheric temperatures from sub-zero to 140° F.

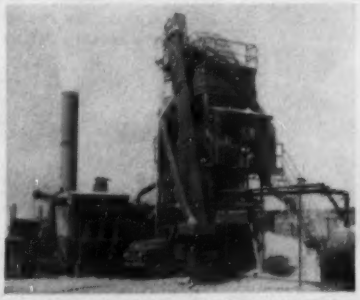
More than 2200 Wisconsin approved service stations and distributors are on the job, ready to serve you, throughout the United States and Canada, not counting parts and service distributors and dealers in 82 foreign countries.

*You* can't do better than to specify "Wisconsin Power" for *your* equipment. Write for Bulletin S-165.

**WISCONSIN MOTOR CORPORATION**

*World's Largest Builders of Heavy-Duty Air-Cooled Engines*

MILWAUKEE 46, WISCONSIN

**NEW BATCHOMATIC PLANTS**—The popularity of the 4000-yd Batch-Omatic bituminous batch plants has caused Barber-Greene Co. to enlarge its line with a 2,000-yd model and a 6,000-yd plant incorporating the same features available in the prototype plant. These include simultaneous weighing of various sizes of aggregate, instant change-over from fully automatic to manual operations, and positive inspection of aggregate gradation and weight. The new models also use Barber-Greene's Dyna-Mix pugmil. Simultaneous measuring is automatic. As all the aggregate gates are opened simultaneously, each weigh hopper will measure only the required batch, regardless of how long the gates are left open. The bitumen supply system works the same way. Because of this principle, the plants' control system uses simple electric switches and timers and does not need electronic equipment. A complete range of dryers, dust collectors, elevators and aggregate cold feed systems for the plants are available.—**Barber Greene Co., 400 N. Highland Ave., Aurora, Ill.**

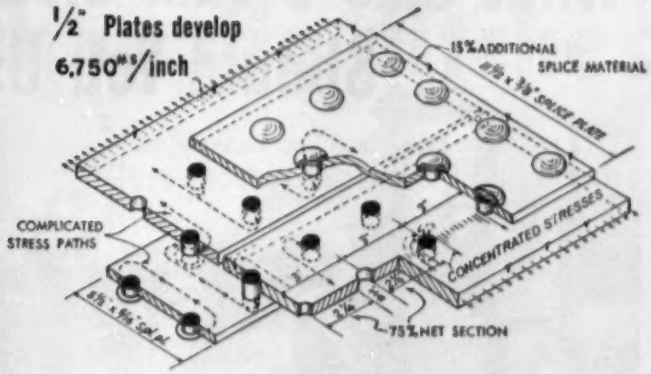
**REDESIGNED DIGGER** — The ground reach of the redesigned 360 Hopto digger has been extended to 26 ft while the digging depth remains 17 ft. Relocation of the two 5-in. hoist cylinders has increased the digging force. A wider choice of power units are now available as

# When steel frames can be simplified . . .

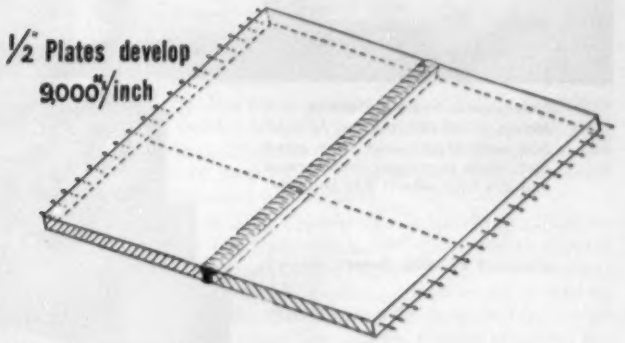
# Have more useable space . . . better appearance . . .

# Yet erected for less cost . . .

# WHY shouldn't you design for welding




**TYPICAL RIVETED JOINT**—*Requires punching, splice plates and rivets*




**TYPICAL WELDED JOINT**—*Provides continuity of original section . . . eliminates stress concentrations*

**WHY punch holes in structural steel . . . only to fill them with rivets.**

**The same structural connection can be simplified, fabricated for less cost, erected in less time by arc welding.**

**How you benefit by welded design is presented in Lincoln Studies in Structural Arc Welding . . . available to designers and engineers by writing**

**THE LINCOLN ELECTRIC COMPANY**

Dept. 2707 • Cleveland 17, Ohio

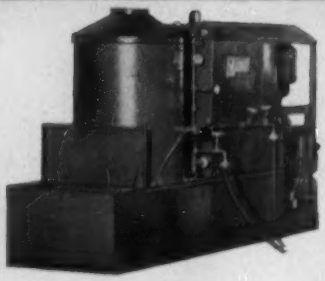
*Pioneer in welded structural design . . . for lower cost*

© 1956 The Lincoln Electric Company

# What Size Steam Cleaner Should You Use?

Simultaneous two-gun cleaning with Malsbary 322 HPC cleaner. At right cold water blast knocks away caked mud, while steam gun cleans grease and dirt from wheels and body.

Malsbary 322 HPC cleaner. →



L. G. Defelice & Son, Inc., nationally-known contractor keeps his Malsbary 322 HPC cleaner busy 10 hours daily, 6 days a week, maintaining this fleet in work trim:

| | |
|---|---|
| 30 D8's | 12 DW20's |
| 8 DW21's | 4 Northwest shovels |
| 70 trucks | 15 compressors |

If you have a large fleet like this, heavy, sticky road tars, thick mud and greasy dirt, enough cleaning to keep one man or more busy full time, then you need a Malsbary HPC cleaner. HPC (patented) = high pressures to 400 lbs. combined with either hot solution to 325° F., cold water, or steam.

**Why HPC Cleans Better, Faster**

Malsbary HPC cleaners use pumps instead of steam for pressure. They can produce: (1) cold water to 400 lbs. for fast removal of caked dirt and mud; (2) hot solution at 325° F. and 150-250 lbs. for cleaning away grease and road oils; (3) hot water at 250-325 lbs. to de-ice equipment or soften caked mud; (4) warm water for hand washing trucks, tractors, etc.; (5) wet steam for degassing tanks and for heating use. Models 300 and 500 operate two or more guns simultaneously, one delivering high-pressure cold water, the other high-pressure hot solution—a real time saver on big rigs and fleets.

If your work calls for intermittent cleaning, or only two to three hours cleaning at a time, chances are a Malsbary steam vapor cleaner will handle your job very well.

**Ask for Demonstration**

Ask your Malsbary jobber now to recommend and demonstrate the right size cleaner for your job ...or write TODAY for literature on the entire Malsbary line. 69

MALSBARY MANUFACTURING CO. SINCE 1921

Room C, 845 92nd Ave., Oakland 3, Calif.



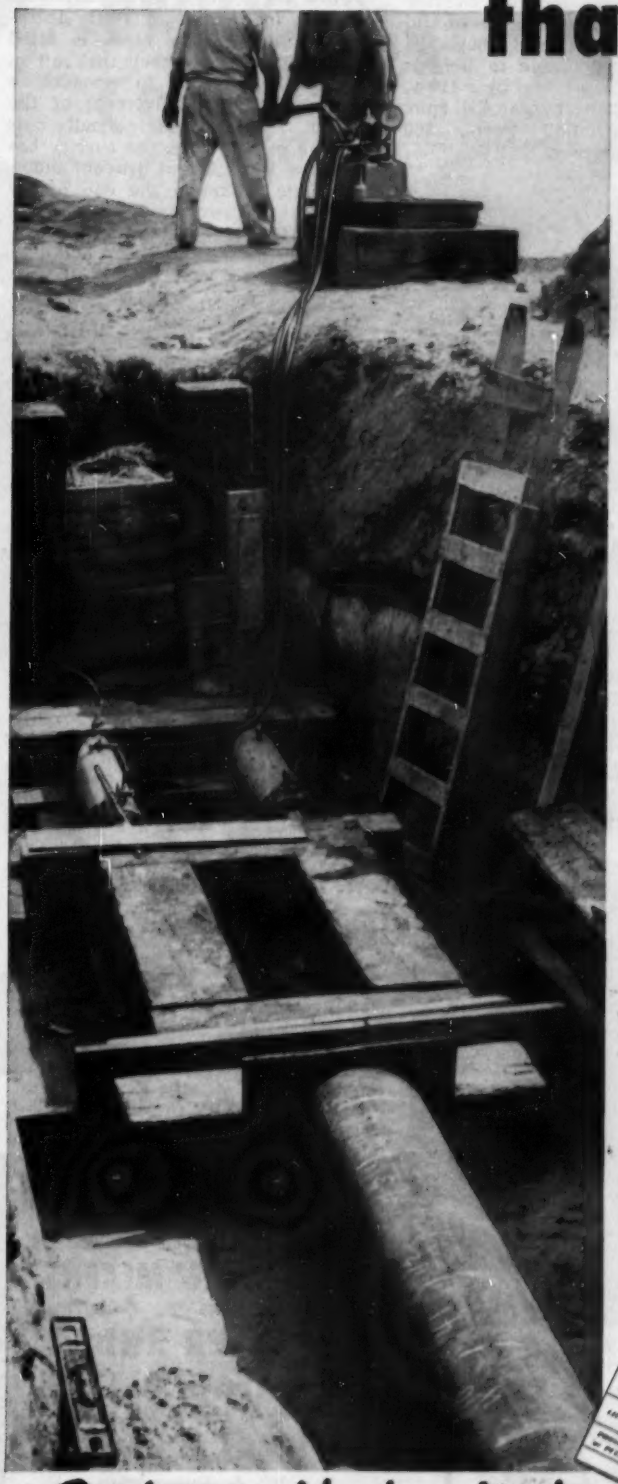

standard equipment. Both ⅜ and ½-yd capacity backhoe and shovel buckets are available.—**Badger Machine Co., Winona, Minn.**

**LIFTS DRUMS**—One man can easily handle 55-gal steel drums with the improved Sterling Drum Lift. Lifting power is supplied by a foot-operated hydraulic jack that can raise drums to a height of 53 in. for pouring or for stacking. The center of gravity of the drum is always maintained within the four casters, making it impossible for the lift to overturn. The easily locked girdle grips the drum firmly and attaches in seconds. Brakes on the drum-lift arms hold the drum at any angle. Four-in. casters are supplied. —**Sterling, Fleischman Co., Broomall, Penn.**

**WORK PLATFORM**—A work platform that can serve as a portable scaffold for any height up to 18 ft has been introduced as an attachment for the Economobile 600 hydraulic loader. The platform, which can be attached quickly and easily, measures 3x4 ft. It has a plank floor laid on an angle iron frame. Three-ft high safety rails are made of tubular steel.—**American Road Equipment Co., 4302 N. 28th St., Omaha, Neb.**

*(Continued on page 244)*

# It costs less to PUSH PIPE than dig ditches



***cut job costs and installation time . . .***

**USE RODGERS HYDRAULIC JACKING UNITS**

You'll cut pipe laying expenses and do the job faster and better by *pushing* pipe under highways, railroad tracks, and other obstructions. You'll avoid time-consuming ditching, backfilling, tamping and paving operations that delay the job and roll up the cost.

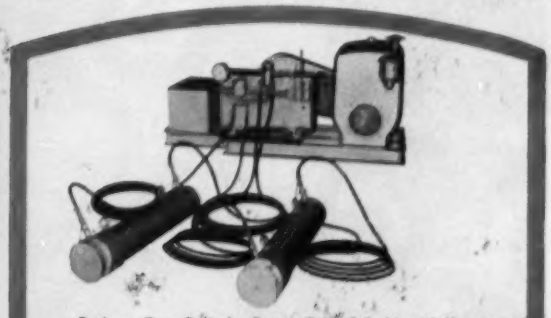
Rodgers Hydraulic Jacking Units can be used wherever you want to PUSH, LIFT or PULL. Multiple jack installations provide equal pressing or lifting power at all points and are ideal for raising or positioning large structural sections.

Photo shows a public utilities crew pushing a 16" diameter steel pipe in 16-foot sections through 44 feet of earth. Two 150-ton capacity, 30-inch ram travel, double-acting Rodgers Jacking Cylinders are doing the job. A hand operated Rodgers Hydraulic Pump furnishes equal power to both jacks.

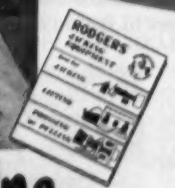
Rodgers Jacking Cylinders used singly or in groups provide steady, precisely controlled power to jack steel casing, corrugated pipe or compressed concrete tile—and they can be used for all types of accurately controlled lifting operations on structures.

Rodgers Jacking Cylinders are available in capacities from 50 to 600 tons with standard ram travels from 6 inches to 48 inches. Longer ram travels to 72 inches available on special order. Tunnel contractors are invited to inquire about our special hydraulic equipment for tunnel shield construction which includes a series of special hydraulic cylinders, power pumps and controls.

A selection of hand or power operated Rodgers hydraulic pumping units offer the exact jacking combination needed for your job. Let Rodgers engineering department assist you in your selections.



Rodgers Two Cylinder Power Driven Jacking Unit
MODEL NO. J150 A2 — 48 — D2



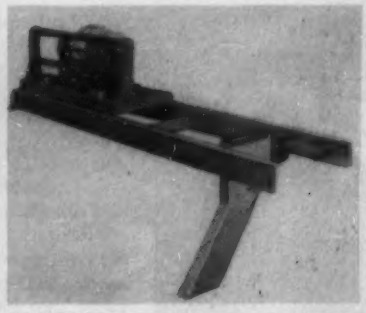
**Send for your free copy of Rodgers Bulletin, 317A.**
It contains a complete description of Rodgers Hydraulic jacking units, quick couplers, valves and hoses, also a description of hydraulic equipment used in the construction of tunnel shields.

HYDRAULICS Rodgers

## ---Rodgers Hydraulic Inc.

7403 WALKER ST., MINNEAPOLIS 26, MINN.

**IMPROVED GIRAFFE** — Rubbing concrete ceilings is made easier with the new Giraffe, thanks to a new spring action at the grinding wheel that maintains constant pressure, adjusts to uneven floor surfaces or ramps, and eliminates the need for minor adjustments. Ribs, fins, board marks, and even nails are quickly removed by the various types of grinding heads available to fit the job. According to the manufacturer, one man will average about 4,000 sq ft per day, without having to set up scaffolding or decking. Narrow enough to fit through doorways and light enough to be easily portable, the Giraffe is available in heights up to 24 ft. It is powered by a 110-v, ¾-hp motor turning at 3,450 rpm. **—Concrete Grinding Corp., 300 Straight St., Paterson, N. J.**



**SAMPLER**—The Denver Automatic sampler with end carriage provides accurate sampling results in normally inaccessible places, according to the manufacturer. By taking the whole of the stream part of the time, the sampler eliminates errors resulting from variations across the stream. Constant intervals between cuts are maintained to obtain equal representation of the entire length of the stream. The intermittent operation of the sampler is controlled by a Telechron motor-driven time switch that can be set for intervals from 2 to 55 min in 1-min increments. The carrier block is fitted with ball-bearing wheels that roll on rigid steel tracks to produce a smooth, uniform movement of the cutter. A switch automatically cuts off the motor when the carrier has reached its limit of travel, and a magnetic brake on the end of the motor shaft prevents over travel. A tight-fitting cover protects the entire mechanism from dust and splash.— **Denver Equipment Co., P. O. Box 5268, Denver 17, Colo.**

**MODIFIED COMPRESSORS**—All LeRoi two-stage portable compressors and Tractairs are now manufactured with new deeper oil pans, according to the manufacturer. The deeper oil pans allow the compressors to operate in more rugged terrain than the previous units. The new oil pans allow portable operation at angles up to 20 deg for the portable compressors and at angles up to 25 deg for the Tractairs. This is more than double the previous angles of operation.—**LeRoi Div., Westinghouse Air Brake Co., Milwaukee 14, Wis.**

*(Continued on page 247)*

***For greater performance . . . lower costs . . . day in and day out . . . it's***

Dollar for dollar—feature for feature—CMC construction equipment is your BEST buy! It's backed by close to half a century of manufacturing experience and know how. If you're looking for BIGGER PROFITS — then you're looking for CMC! CONSTRUCTION MACHINERY COMPANY, Waterloo, Iowa.

**CMC JOB MIXERS** are the biggest money makers in the mixer field. 3½ to 16 cubic foot models. WRITE FOR CATALOG!

CMC's large variety of types and sizes of pumps — assure lower cost water handling on any construction job! At left, 10" Dual Primer; at right, SKWEE-GEE diaphragm.

*A COMPLETE LINE OF AMERICA'S FINEST*

- **TRUCK MIXERS** — 4 sizes — 3½ to 7-yard capacities
- **BUILDING MIXERS** — from 3½S to 84S
- **PLASTER AND MORTAR MIXERS** — from 3½ to 12 cubic feet
- **PUMPS**—Dual Primers from 1 to 10", diaphragms, others.
- **HOISTS**—Many models. Single, double drums to 45 H.P.

# PROLONGED CONFINEMENT COUNTS

## ...when it comes to blasting efficiency

Preparing for "coyote" shot. Tunnel dug 50 ft. into hillside . . . then right-angled 25 ft. off trunk in either direction. Atlas explosives loaded at ends of "T" crossbar. Back-filled. Ready to fire electrically.

Prolonged confinement of blast keeps 8250 lbs. of explosives hard at-work underground. Little wasted energy. Explosives force disintegrates hillside. Good displacement. Excellent fragmentation.

Huge, workable final pile: 25,000 yds. of well-crushed rock . . . broken into small fragments. Here's peak blasting efficiency . . . easy work for the shovel. It's the prolonged confinement that counts!

## PROLONGED CONFINEMENT—the Rockmaster® way

How's this for breakage! For explosives efficiency! Here's a blast that really paid off—in good displacement . . . in quick, easy, economical removal.

When it comes to getting the most out of your explosives, it's *prolonged confinement* that counts! In this "coyote" shot, Roseburg Lumber Co., Roseburg, Ore., loaded 7750 lbs. of Atlas Flodyn and 500 lbs. of Atlas 40% Gelatin well inside the hill. Explosives force was confined to the burden . . . instead of blasting the air. The right combination of ROCKMASTER electric blasting caps and Atlas explosives shows—

- **good control**
- **improved breakage**
- **greater efficiency**
- **better public relations**

Before your next blast, why not go over your specific blasting problems with your Atlas representative? He has ideas and experience you can put to use . . . and profit from. And get "Better Blasting"—Atlas' informative newsletter on latest methods and materials. Write us to put your name on our mailing list today.

EXPLOSIVES DEPARTMENT

**ATLAS POWDER COMPANY**

WILMINGTON 99, DELAWARE

*offices in principal cities*

# PLACING CONCRETE
# SETTING STRUCTURAL STEEL
# HANDLING MATERIALS

## These Bucyrus-Erie Crane Features Help You On Every Phase of Building

**Maximum Stability-** A low center of gravity and long, wide-spread crawler units give Bucyrus-Erie cranes a firm footing for the safe handling of long booms. This kind of stability enables operators to work rapidly.

**"Full-Feel" Control-** Direct-connected controls give operator unequaled "feel" of the load. Big clutches are instantly responsive, smooth in action, provide utmost load-handling safety, let the operator "inch" load accurately up or down.

**Independent Boom Hoist-** Boom hoist on Bucyrus-Erie cranes is independent of all other functions . . . is available instantly for boom angle changes. Lowering speed is power-controlled.

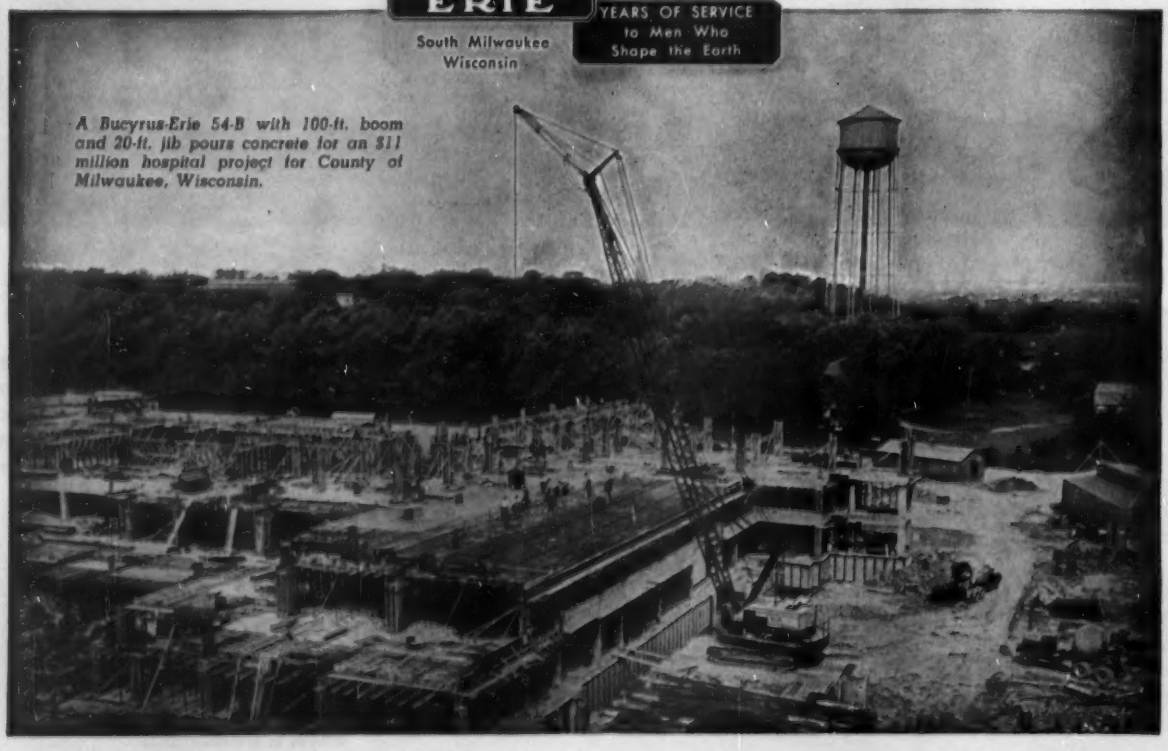
**Simple Jib Extension Connections-** Jib extensions can be connected without removing sheaves, guards, suspension ropes or any of the boom-point machinery.

See your Bucyrus-Erie distributor for complete information on cranes with boom lengths up to 120 feet. Jib extensions are from 10' to 30' long. Crane capacities are variable depending on length of boom, size of crawler mounting, and counterweight used.

153E55

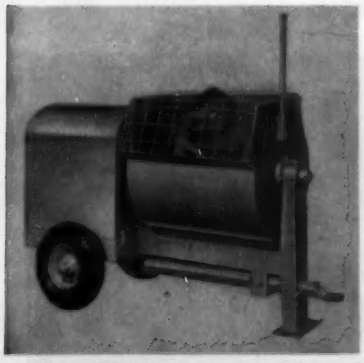
BUCYRUS ERIE
South Milwaukee Wisconsin

75 YEARS OF SERVICE to Men Who Shape the Earth



*A Bucyrus-Erie 54-B with 100-ft. boom and 20-ft. jib pours concrete for an $11 million hospital project for County of Milwaukee, Wisconsin.*

**LIGHTWEIGHT WINCH HOIST**—The Lug-All winch hoist lifts or pulls a 2-ton load a distance of 10 ft when used double cable, but weighs only 15 lb. Its protected main frame is of aluminum alloy and provides easy access for inspection and cleaning. Other features include oiled-for-life bearings, stainless steel springs, three workable hooks and a built-in pulley that can be used as a snatch block in close quarter work. The unit has a safety handle with an interlocking pawl system that securely holds the load. There are no brakes to slip and free release is possible only under no-load conditions. Priced at $49.50.—**Lug-All Co., 355 Lancaster Ave., Haverford, Pa.**



**SMALL MIXERS**—A new line of small, tilting-type mixers is offered by the Speed King Manufacturing Co., a division of the Jaeger Machine Co. The 4 and 6-ft plaster-mortar mixers feature pugmill type mixing by four sets of three-blade paddles that are clamped to a square shaft. The shaft is carried on Timken bearings equipped with grout-proof bearing seals. Clinton and Briggs &


LOOK TO WILLSON
for another new development in head protection!

NOW—SUPER-TOUGH
PHENOLIC
SAFETY HATS AND CAPS

FROM THE WILLSON RESEARCH CENTER now comes the "Phenolic" line of scientifically designed safety headgear that meets all specifications with ease!

In this Super-Tough line are safety developments so outstanding that you'll find it offers unequalled value. For instance, the famed "geodetic suspension" and the unique pneumatic headband are obtainable in both adjustable *lace-in* and *snap-in* types of hats and caps.

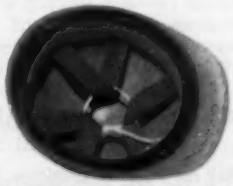
Ask your Willson distributor to demonstrate the heavy duty Phenolic line that combines comfort and maximum head protection. Or write for latest "Super-Tough" bulletin describing them in detail.

**Strongest Made!**

See how it's built up from 24 individual die cut pieces into a sturdy Phenolic pattern that withstands repeated 80-foot-pound drop ball tests without even fracturing!

**LACE-IN SUSPENSION**

Both hats and caps are available with convenient lace-in suspension feature. Easily adjusted for snug comfort to any head size.



**SNAP-IN SUSPENSION**

Handy Center-Tie snap-in type suspension is also obtainable in Super-Tough hats and caps. Willson's exclusive patented "Geodetic Suspension" and Pneumatic Headband can be had in any style!

Over 300 safety products carry this world-famous trademark

WILLSON PRODUCTS, INC.
141 Thorn Street, Reading, Pennsylvania

# DOWN TO FUNDAMENTALS

SMALLER AND BETTER

KERN'S NK3 Precise Engineers' Level. The world famous engineering tool especially designed for accurate leveling.

The NK3 offers over 100 years of Swiss Master Craftsmanship and the latest technical achievements compressed into 4 lbs. of maximum precision, operational efficiency and economy.

- Mean leveling accuracy per mile (normal conditions) ± .008 Ft.
- Coincidence bubble is viewed directly through 30X telescope, allowing constant check on bubble centering while reading rod.
- Ready for use right out of the case. Highest precision leveling with coincidence spirit level and tilting screw. Coated optics give increased brilliance and contrast in the image.

MORE RELIABLE READING IN LESS TIME!

*Ask for Detailed Brochure NK527-3*

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SERVICE DEPARTMENT
FACTORY TRAINED PERSONNEL

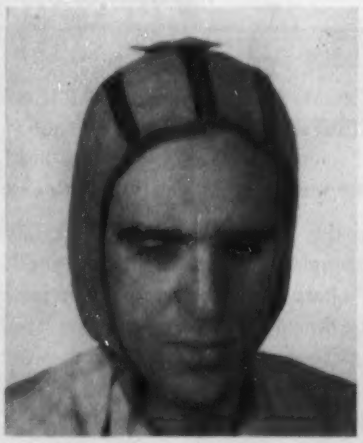
Kern SWISS — The FINEST in SURVEYING EQUIPMENT

KERN INSTRUMENTS INC.
120 Grand St., White Plains, N.Y.


## EQUIPMENT NEWS... Continued

Stratton engines with built-in transmissions drive through double v-belt to the jack shaft. The 4-ft model has a low loading height of 34 in. and is 29½ in. wide.—**Speed King Mfg., 550 W. Spring St., Columbus 16, Ohio.**

**'56 TRUCKS**—Four Wheel Drive Auto Co's 1956 line of cab-over engine trucks range from the Model 140 with a GVW rating of 14,500 lb to the model 409 with a GVW rating of 40,000 lb. Altogether the line consists of 12 models with engine ratings from 131 to 240 hp. Standard center differential on all the trucks is FWD's "50-50" power divider, which sends half the torque to the front driving wheels and half to the rear wheels. The 131-hp model 140 has a 142-in. wheelbase, while all the other models have 154-in. wheelbases. Engines have tapered-front, heat-treated alloy steel channel frames that provide strength without adding greatly to the chassis weight.—**Four Wheel Drive Auto Co., Clintonville, Wis.**

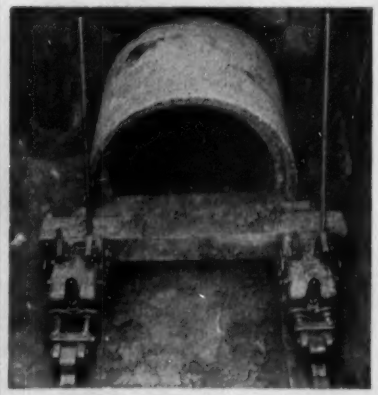


**HELMET LINER**—A new cold weather helmet liner is so modestly priced that it may be discarded when it gets dirty. The liner is made of a tough twill fabric interwoven on the inside with warm fleece. Cut to give maximum coverage of the head and ears, the liner has straps on top that tie on the helmet harness to keep it from falling or blowing off. An adjustable snap-on chin strap assures perfect fit. The liner sells for only $.69.—**General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.**


FAST, EASY WAY TO INSTALL PIPE... AT LOWER COST

PUSH PIPE UNDERGROUND WITH A GREENLEE HYDRAULIC PUSHER

Here's the simple, cost-cutting way to install underground pipe. Speed your jobs with a GREENLEE Pusher. One-man-operated, portable, simple to operate. No tearing up of pavement . . . eliminates extensive ditching, tunneling, backfilling, tamping, repaving. Cuts job time to a fraction. GREENLEE Hydraulic Pipe Pusher often pays for itself on first job. Two sizes — model shown above for pushing 3/4" to 4" pipe. Larger unit, below, for pipe over 4", concrete sewer pipe and large drainage ducts. Power pump (as shown above) also available for extra ease and speed of operation.



GREENLEE

Write today for descriptive literature. Greenlee Tool Co., 2183 Columbia Avenue, Rockford, Illinois, U.S.A.

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***AiResearch Turbochargers provide rapid response to acceleration demands...end objectionable smoking!***

Consider what the application of AiResearch Turbochargers to diesel locomotives will accomplish: A team of these small power packages will provide a greater increase in power at smaller cost in space and weight than any comparable turbocharger or supercharger installation.

In addition, specific fuel consumption on a horsepower per hour basis will be far less. Sea level performance will be restored within operating limits at altitude, response to acceleration demands will be rapid and excessive smoking under operating power eliminated. Also, the noise level will be greatly reduced.

Application in other fields will be equally effective, as has already been demonstrated in the remarkable results achieved by the installation of AiResearch Turbochargers on Caterpillar diesel machinery.

AiResearch is the largest producer of small turbomachinery in the United States, with twenty-five *million* hours of experience. This unmatched experience explains why AiResearch Turbochargers lead in power, economy and dependability.
Your inquiries are invited.

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DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

U. S. Steel photo

Ray Popp (left), of Pittsburgh, and a co-worker put muscle behind their *Snap-on* Heavy-Duty Loxocket wrenches. They're working on the false work used to support a span of the Mackinac Bridge.

**Mackinac Bridge**

**REACHES SKYWARD**

**with a boost from Snap-on Tools**

Stretching five miles between the upper and lower peninsulas of Michigan, the new Mackinac Bridge will provide a much-needed link between the two sections of the state. The bridge will replace ferry service — cutting transit time from 53 minutes to 10 minutes

No one has figured how many bolts will be required to finish the project. One thing for sure, though — *Snap-on* tools, like the Loxocket wrenches ironworker Ray Popp is using, are on the job. Popp has used *Snap-on* tools for years on many different jobs and says, "I couldn't get along without them."

Men who work on big jobs — erecting or repairing — depend on husky, powerful *Snap-on* tools. Built with an extra safety factor to protect workers, *Snap-on* tools give tremendous leverage to break loose rusted nuts and bolts or pull them up to the tightest degree.

See your *Snap-on* tool dealer or write for a copy of catalog "V" listing over 4,000 *Snap-on* tools for building the big jobs or servicing tractors, trucks and cars.

**SNAP-ON TOOLS CORPORATION**

8042-C 28th Avenue • Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation.


# New Publications

*These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.*

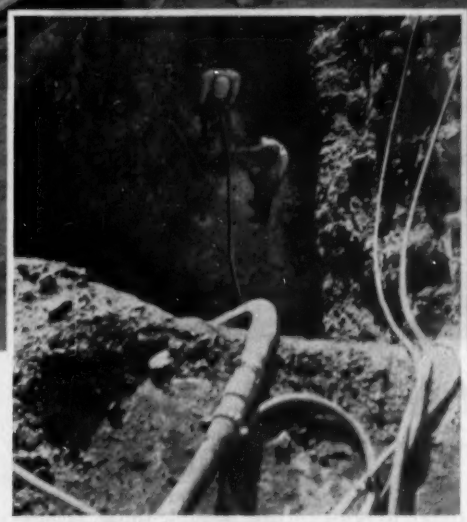
**BUCYRUS-ERIE 15-B** — Illustrated with on-the-job photographs and closeups of mechanical features, a 40-p booklet includes complete specifications and working ranges of the 15-B excavator-crane. The 15-B is a ½-yd shovel that is readily convertible to dragline, clamshell, dragshovel or lifting crane for handling a wide range of excavating and lifting jobs. It is available with gasoline engine, diesel engine or electric motor.—**Bucyrus-Erie Co., South Milwaukee, Wis.**

**SPLICING WIRE ROPE**—A new 32-p illustrated brochure gives detailed information on splicing and fitting wire rope, including sections on making a tuck, marine eye splice, and endless splice, among others. Step-by-step photographs and drawings illustrate correct methods of splicing and fitting.—**E. H. Edwards Co., Butler Rd. and Industrial Way, South San Francisco, Calif.**

**SKID SHOVEL**—Information describing the Hydro-Spring feature of the International Drott skid-shovel is contained in a new 4-p catalog. The Hydro-Spring, which acts as a shock cushion, is available in four skid-shovel models ranging from 1 to 3-yd capacity. The shovels are mounted on International crawlers ranging from the small TD-6 up to the TD-18. Ask for form CR-403-F. —**International Harvester Co., Consumer Relations Dept., 180 N. Michigan Ave., Chicago, Ill.**

**WIRE ROPE USES**—"Wire Lines For Drillers" is the title of a 60-p handbook on the selection, use and care of wire rope in drilling operations. The handbook, pocket sized for easy reference, has many drawings comparing the right and wrong way of using and maintaining wire rope. Also included are diagrammatic drawings of the various types and information on rope for rotary and cable tool drilling.—**Wire Rope Div., Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.**

**VERSATILE TIMBER**—A new booklet called "Specify Timber" illustrates applications of the Teco connector system in clear-span roof construction ranging from small suburban stores to massive aircraft hangars with roof trusses spanning 250 ft. Also shown are examples of



Typical trench depth on $1,000,000 sewer excavation job by Geo. Sheaf & Company. Le Roi air power and Le Roi-Cleveland air tools were used to drill through rock.

Le Roi-Cleveland PL30 Drill Rigs, hung from crane boom, cut production time in half on the rock drilling project by Geo. Sheaf & Company near Tiffin, Ohio. Le Roi 600-cfm portable air compressors, and a self-propelled, 125-cfm Le Roi Tractair provided air power.

# Rock-Drill Rig on Sewer Job Speeds Production 50%

**Contractor uses Le Roi-Cleveland Air Tools to shoot and pull rock, often 18 feet deep, with one drilling.**

The right air tools made quite a difference on a $1,000,000 sewer excavation near Tiffin, Ohio. Joseph Parker, General Superintendent of Geo. Sheaf & Company, Columbus, Ohio, states, "In nearly seven months of service in hard limestone, our Le Roi compressors and Le Roi-Cleveland Rock Drills had no down time, while in continuous operation 8 to 16 hours per day. They have performed to our utmost satisfaction. By using Le Roi-Cleveland PL30 Drill Rigs, we lowered our drilling costs and speeded production by 50 per cent."

**Flexibility of special drill rig** was a major factor in job speed-up. The Le Roi-Cleveland PL30 Drill Rigs provided unusual flexibility and ease of operation. This specially-designed rig, developed for rock work on pipeline projects, allowed the contractor to obtain proper drilling patterns for safe blasting in residential areas. Thus he cut construction time in half because he could shoot and pull the rock with only one drilling.

**The Contractor standardized on Le Roi-Cleveland Air Tools** using two PL30 Drill Rigs, two Model 52 Breakers, and two H10B Sinker Drills, plus hose, drill steel, and rock drill bits.

**Le Roi air power** helped speed up this project. Two Le Roi 600-cfm portable air compressors, and one self-propelled Le Roi Tractair (a combination 42-hp. wheel tractor and 125-cfm air compressor) were used.

**This combination** of Le Roi air power and Le Roi-Cleveland air tools gave the contractor exceptional drilling economies, including manpower savings, less upkeep, and more footage per shift.

Le Roi Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufactures portable and stationary air compressors, heavy-duty industrial engines, the Tractair and air tools. Write today for information about any of these products.

RD-75

*(Advertisement)*

# Firestone NYLON TIRES

## MOVING 60,000 CUBIC YARDS A DAY TO HELP TAME THE MIGHTY MISSOURI

THE earthmoving unit shown above is typical of the many Firestone equipped units that are running round the clock to speed construction of Oahe Dam on the Missouri River. When completed, Oahe Dam will be the largest rolled filled earth dam in the world.

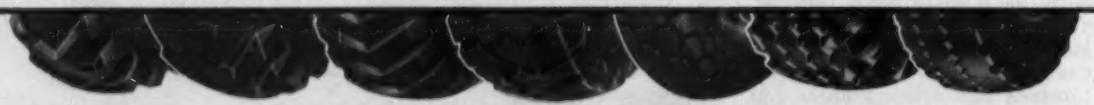
It is on projects such as this that Firestone nylon tires prove their superiority in reducing tire costs and downtime.

Firestone nylon tires are built for the toughest service. The treads give maximum traction and they are extra tough to resist cutting. Double-thick sidewalls give added protection against cuts and snags.

Firestone's Safety-Tensioned Gum-Dipped nylon cord body gives greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Let your Firestone Dealer or Store show you how Firestone nylon tires will cut downtime and increase the profits on your job.

**A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE**



GROUND GRIP GG WIDE BASE ROCK GRIP RG WIDE BASE ALL NON-SKID ALL TRACTION RIB EXCAVATOR

**WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES, SPECIFY FIRESTONE**

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## NEW PUBLICATIONS . . .
Continued

the three principal methods of design in timber construction—the Teco connector, glued laminated, and Lamella systems.—**Timber Engineering Co., 1319 18th St., N. W., Washington 66, D. C.**

**INTERNATIONAL TRUCKS**—Information on International six-wheel trucks is contained in a new 24-p catalog now available. S-line, R-line, and CO models, powered by gasoline, diesel or LPG engines, are described. International six-wheelers range in GVW ratings from 22,000 to 60,000 lbs.—**Motor Truck Div., International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.**

**FASTENERS**—A 4-p folder tells how Tuff-Tite fasteners with Neoprene washers form an effective watertight seal when applying roofing and siding of aluminum, galvanized or stainless steel, protected metal and insulated panels. Recommendations for proper placing, torque settings, and drill sizes are also given.—**Townsend Co., Box 237-2, New Brighton, Pa.**

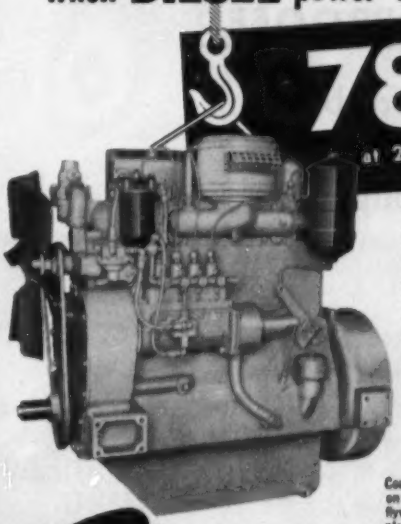
**BUFFALO-SPRINGFIELD ROLLERS** — Bulletin S-70-1155 covers heavy-duty 2-axle variable weight tandem rollers. The 12-p bulletin describes features of the 5-8-ton model Kt-16D, the 6-9-ton model Kt-17D, the 8-14-ton model KT-24, and the 10-16-ton model KT-25D. A handy table gives comparative dimensions, specifications, weights, and compression data for the four models.—**Buffalo-Springfield Roller Co., Springfield, Ohio.**

**STEAM CLEANERS**—More than 175 Malsbary steam cleaner service centers throughout the United States and Canada are listed in a 4-p folder recently released. All authorized service centers maintain a stock of parts, full-time service men, and sales facilities.—**Malsbary Mfg. Co., 845 92nd Ave., Oakland 3, Calif.**

**KWIK-MIX UNIT**—A new illustrated catalog explains the features of the 1-bag capacity model 6-S Dandie concrete mixer, manufactured by the Kwik-Mix Co., a subsidiary of the Koehring Co. Operating features incorporated in the new 6-S include an automatic syphon-type water tank, flowline discharge chute, multiple V-belt drive and a selective skip shaker to speed drum charging. The mixer is powered by either a 10 or 16-hp gas engine.—**Kwik-Mix Co., Port Washington, Wis.**

**PIONEER REFERENCE MANUAL**—The eleventh edition of Pioneer Engineering Works popular "Facts and Figures" contains 100 pages of up-to-date data of interest to highway and


Pick it up and set it down in your equipment when **DIESEL** power is called for



78 H.P. at 2000 rpm.

Available with Sheppard Engineered transmission, torque converter or other special equipment.

The Sheppard Model 16 is compact, easily engineered into existing equipment designs. Sheppard simplified fuel injection system requires no special service training or tools. Dependable and easy to operate, Sheppard Diesels are the obvious choice to replace costly gasoline engines in the equipment you build . . . or operate. Let Sheppard help you make the switch to Diesel . . . profitably.

Complete specifications on request. Fan to flywheel engine or complete power unit.

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Hanover 16, Pennsylvania

BUILDERS OF DIESEL ENGINES, TRANSMISSIONS, REAR AXLES AND POWER STEERING UNITS FOR INDUSTRY.

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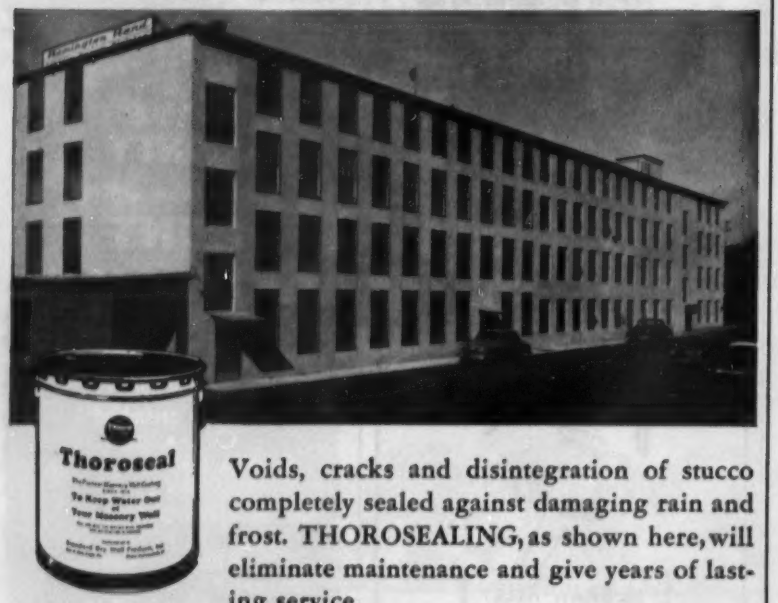
# THOROSEALING
## MEANS
## WATERPROOFED

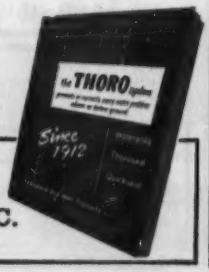
Stucco-surfaced factory building gets protective coat of Buff THOROSEAL for longer life.

During renovation. Far right of Remington Rand factory building showing application of THOROSEAL, in contrast.




Voids, cracks and disintegration of stucco completely sealed against damaging rain and frost. THOROSEALING, as shown here, will eliminate maintenance and give years of lasting service.

Materials applied by Remington Rand Inc. Maintenance Department. Herkimer, N. Y.

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"HOW TO DO IT"
**STANDARD DRY WALL PRODUCTS, INC.**
NEW EAGLE, PENNSYLVANIA


## NEW PUBLICATIONS...
**Continued**

heavy-construction contractors and engineers. Sections include data on aggregrate specifications, crusher settings, feeder capacities, earthmoving equipment formulae, screens, and tank capacities. An enlarged section is devoted to asphaltic materials and their uses. Included is an 8-p glossary of terms used in the trade.—**Pioneer Engineering Works, Inc, 1515 Central Ave., Minneapolis 13, Minn.**

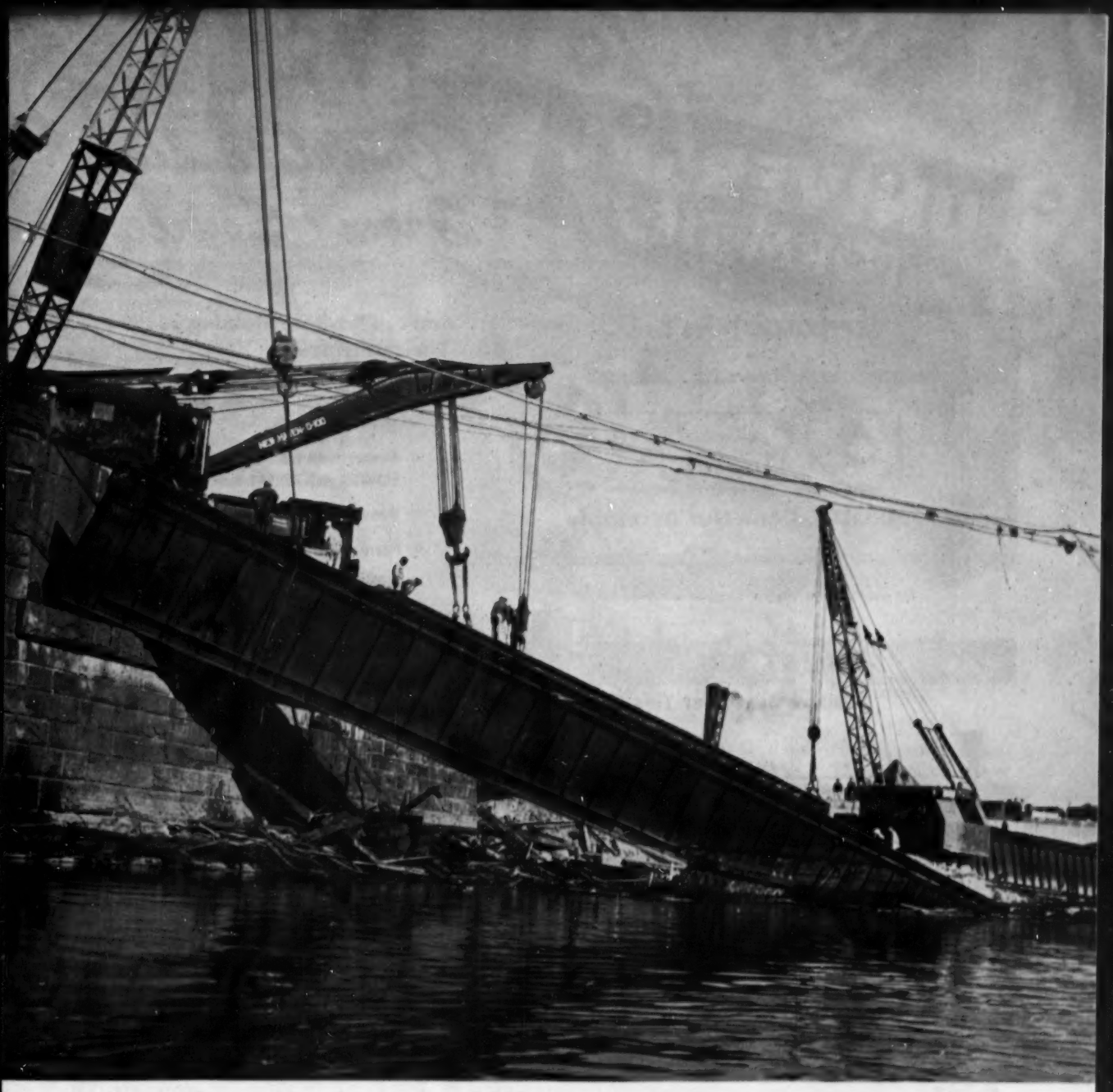
**TOWMOTOR LINE**—New developments in materials handling are discussed in three new 4-p brochures covering the entire Towmotor line of fork lift trucks, tractors, and accessories. One folder gives standard specifications on all Towmotor fork lift trucks and the other two outline the development of Towmotor accessories.—**Towmotor Corp., 1226 E. 152nd St., Cleveland, Ohio.**

**CONVEYOR CATALOG**—The advantages of an integrated conveyor system are described in Barber-Greene's new 192-p conveyor catalog. Included are more than 85 job photos and 16 valuable plant layouts covering many conveyor applications.—**Barber-Greene Co., Aurora, Ill.**

**WORTHINGTON MIXERS** — The complete line of Hi-Up truck mixers is illustrated and described in a new 15-p bulletin. A series of pictures illustrates accessibility features by showing the mixer from several angles. Maximum legal payload and truck mixer weight data is included along with information on uniform mixing and clean discharging. Input shafts, gear trains, clutches, output shafts and drum driving chains are shown in cutaway photographs. —**Worthington Corp., Advertising and Sales Promotion Dept., Harrison, N. J.**

**DEMOLITION EQUIPMENT**—Gas engine or electrically driven Pinazza rock drilling and demolition equipment is described in a new bulletin. In addition to outlining the characteristics of the three models of hammers and the six available gas engines and electric motor drives, the literature explains the patented "Centripowered Ram" principle, which prevents overloading and permits drilling to depths of 16½ ft with the compact unit.—**Pitman Industrial Products Co., 608 Fifth Ave., New York 20, N. Y.**

**CONVERTS TO FOUR-WHEEL DRIVE**—A 4-p pamphlet describes Napco's Powr-Pak four-wheel drive units for use with GMC and Chevrolet trucks. The units are sold and installed by GMC dealers to convert two-wheel drive into four-wheel drive. Full specifications are included.—**Napco Industries, Inc., Minneapolis 11, Minn.**



**Wire Rope at Work**—When Hurricane Diane loosed one of the most destructive floods in history, scenes like this were common. The angry torrents swept parts of Pennsylvania, New Jersey, New York, and New England, taking a staggering toll of lives and property. Bridges like the one above, in western Connecticut, were playthings of the raging waters.

Prior to the disaster, this bridge spanned the Naugatuck River. To salvage what was left after the flood, the Foundation Company was summoned from New York, and its hard-working crews and equipment were soon on the job. An emergency shipment of Bethlehem wire rope, ordered by telephone, was rushed to the site of operations; hustled into service. It had the muscle for the tremendous lifts involved, and in no time at all, the work of moving the wreckage was underway.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation *Export Distributer:* Bethlehem Steel Export Corporation

*Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:*

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**Faster Erection . . . Positive Holding . . . Easier Stripping**

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The most positive internal spreader and form tie

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*Service Wherever You Build . . . Coast to Coast*

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## IT'S YOUR BUSINESS . . .

Continued from page 26

Minneapolis notes slow deliveries on crawler tractors, tractors with cable scrapers, motor graders, and heavy duty trucks. Deliveries are running about three months on all of these, execept trucks. While truck stocks are enough to meet current demands, a shortage is probable in two or three months.

Chicago has a shortage of rubber-tired scrapers, and deliveries are slow.

Boston reports truck deliveries are months behind, except for Internationals. Stocks of other makes are very low or non-existent and deliveries take up to 24 weeks. All makes of diesel crawler tractors are in short supply.

Up in Canada, Toronto distributors are short of tractors, tractors with scrapers, and truck cranes. Deliveries are slower than normal for a wide range of heavy equipment. However, Montreal is in much better shape. Although sales in December and January were up over a year ago, stocks and deliveries are normal.

## SOME BIG CONTRACT AWARDS OF THE MONTH

**Grove, Shepherd, Wilson & Kruge, Inc.,** 400 Madison Ave., New York 17, N.Y. Conversion of riding hall to academic building, at U.S. Military Academy, West Point, N.Y. for U.S. Engineers, 111 E. 16 St., New York 3, N.Y. $9,040,838.

**George A. Fuller Co.,** 597 Madison Ave., New York 22, N.Y. Twenty-story home office at Broad St. opposite Washington Park, Newark, N.J. for Mutual Benefit Life Insurance Co., 300 Broadway, Newark, N.J. $10,000,000.

**Turner Construction Co.,** 420 Lexington Ave., New York, N.Y. Fifty to sixty-story office and parking garage at Liberty, William, Pine and Nassau Sts., New York for the Chase Manhattan Bank, 18 Pine St., New York 15, N.Y. $75,000,000.

**United Engineers & Constructors, Inc.,** 1401 Race St., Philadelphia, Pa. Electric generating station in Overpeck Creek, two 275,000-kw turbine generator units at Ridgefield, N.J. for Public Service Electric & Gas Co., 80 Park Place, Newark, N.J. $129,000,000.

**Morrison-Knudsen Co., Inc., Walsh Construction Co., and Perini-Quebec,** 122 E. 42 St., New York, N.Y. Robi-

# He didn't look the part...

***but it cost us $71,000 to find him out!***

*(Based on Company File #114697)*

Odd thing about embezzlers. They're hard to recognize.

We know. Had one in our midst. And never suspected him at all!

He was in charge of customer payments. Also handled our accounts receivable records. He took in the money, issued receipts, credited the customers' accounts in full. *Then he entered smaller amounts in the cash book.* The difference went into his pocket.

Annual audits? Of course we had them. But he beat them year after year by an absurdly simple method...

He'd prepare a listing of accounts receivable. And an adding machine tape of totals. Nothing wrong with the listing. It was complete. Correct to the penny.

His gimmick was in the grand total on the tape. He fixed that to balance with the amount indicated as outstanding by the cash receipts record. Who'd question the total on an adding machine tape?

Someone finally did. That's how we discovered the dodge he'd worked for five years. In that time, he'd stolen $71,000 from us!

Fortunately, this company was protected against embezzlement losses by a Hartford Blanket Fidelity Bond.

Be sure *you* are. And don't underestimate how *much* a dishonest employee can get away with!

A Hartford Blanket Fidelity Bond offers solid protection against employee dishonesty. Covering all employees, it acts as a deterrent to theft. If losses *do* occur, it pays you for money, equipment or other company property stolen by employees.

Your Hartford Accident and Indemnity Company Agent or your insurance broker will be glad to explain the many advantages of a Hartford Blanket Fidelity Bond. Call him—*now.*

***Year in and year out you'll do well with the***

# Hartford

**Hartford Fire Insurance Company**
**Hartford Accident and Indemnity Company**
**Hartford Live Stock Insurance Company**
**Citizens Insurance Company of New Jersey . . . *Hartford 15, Connecticut***
**New York Underwriters Insurance Company . . . *New York 38, New York***
**Northwestern Fire & Marine Insurance Company**
**Twin City Fire Insurance Company . . . *Minneapolis 2, Minnesota***

The ECONMOBILE has seven different attachments: Pallet fork; auxiliary tower; concrete hopper; aggregate and general purpose bucket; dozer blade; work platform; and chain boom. And each attachment makes the ECONMOBILE a different piece of machinery.

The ECONMOBILE has a hoisting height of up to 22 feet; a reach of up to 6 feet; and a clearance of 8 feet.

Why not get complete details on this versatile machine that has saved many contractors as much as $368 per day on labor costs.

write, wire or call

*manufacturer of famous American Road Grader*
**AMERICAN ROAD EQUIPMENT COMPANY**
4318 North 28th Street Omaha, Nebraska
Phone PLeasant 2575



HAE—MA-182-156

**Correctly engineered to bear heavier loads, lengthen rope-life, reduce maintenance costs**

• Because they're designed and engineered for specific tasks, you'll find MADESCO blocks with heavy steel shells and fittings your *safest* choice. In materials, in construction too, Madesco tackle blocks assure you the extra service that comes from over thirty years of specialized experience and "know-how." Buy Madesco blocks and you make substantial savings on your rope costs, because Madesco sheaves (of iron or steel graphite bronze) are correctly-grooved to prolong rope-life. Loads travel smoothly, easily, quickly to save lifting time; that means savings too that come from minimized maintenance and down-time. There's a complete line of Madesco tackle blocks for every need. Consult your industrial distributor—and meantime write for our catalog.

WORTH ASKING FOR—BY NAME

**MADESCO BLOCKS**

MADESCO TACKLE BLOCK CO., Easton, Pa.


## CONTRACTS AWARDED...
**Continued**

son Bay Lock 3½ mi northeast of Massena, New York for U.S. Engineers, Engineer Park, Niagara and Bridge Sts., Buffalo 7, N.Y. $20,172,451.

**Ebasco Services, Inc.,** Platte River Dr., Denver, Colo. Steam electric generating station (first unit) at Palisades, Colo., for Public Services Co. of Colorado, 5525 E. 38 St., Denver, Colo. $4,500,000.

**V. Barletta Co.,** 10 Whipple Ave., Roslindale, Mass. Tunnel north approach etc. John F. Fitzgerald Expressway between Oliver and Kneeland St., Boston, Mass. for Commonwealth of Mass., Department of Public Works, 100 Nashua St., Boston, Mass. $13,583,491.

**Karl H. Kettlehuo,** 70 B Lafayette Loan & Savings Bldg., Lafayette, Ind. General contract completion of Union Hall of music annex, West Lafayette, Ind. for Board of Trustees, Purdue University, West Lafayette, Ind. $7,025,000.

**Ferry Bros., John M. Ferry, Peter L. Ferry and Son, L. A. and R. S. Crow,** 5201 San Fernando Rd., Glendale, Calif. Six-lane 2.9-mi divided freeway, two overcrossings and three undercrossings part of Caruquinez Twin Bridge and approaches Contra Costa County. California State Division of Highways, 1120 N. St., Sacramento. $7,098,690.

**Hendrickson Bros., Inc.,** 63 N. Central Ave., Valley Stream, N.Y. Elimination of grade crossings of Long Island R.R. with various streets in Hamlet of Baldwin and Village of Freeport for Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany. $3,032,990.

**F. D. Kessler, Inc.,** Northumberland, Pa. Divided highway, reinforced-concrete pavement, two I-beam bridges, paving interchange ramps, grading, open spandrel reinforced-concrete arch bridge with I-beam approach spans and one I-beam bridge in Hamburg Borough and vicinity for State Highway Department, 560 N. Office Bldg., Harrisburg, Pa. $3,067,961.

**Bechtel Corp.,** 220 Bush St., San Francisco, Calif. Chemical manufacturing plant expansion at Houston, Tex., Petro-Tex Chemical Corp., First National Bank Bldg., Houston, Tex. $13,500,000.

"Sonny" Caravello (right), Greco Supervising Foreman, and Standard automotive lubrication specialist, Tom Farrell, go over Greco lube requirements. Tom Farrell has an engineering degree and has completed the Standard Oil Sales Engineering School. He has been providing lubrication technical service to Standard Oil customers for six years. Customers find Tom's experience and training pay off for them.

# Greco Contractors, Inc. "moves the earth"

## *STANOLUBE S-1 Motor Oil helps keep Greco's equipment on the move*

A lot of dirt in greater Chicago has been pushed around and hauled out of the way by Greco Contractors, Inc. One of the big projects on which Greco is now making the dirt fly is Chicago's Congress Street Superhighway. Greco dirt hauling trucks and dozers and shovels use STANOLUBE S-1 Motor Oil. There are good reasons why.

**Moving dirt is a dirty job.** Greco has neither time nor opportunity to baby equipment. Greco has a first rate maintenance system in operation and top servicing facilities but to meet schedules, dozers, shovels and trucks have to work hard and at top speed. This places a heavy burden on the motor oil. A motor oil that can't stand up to this kind of service breaks down. Heavy deposits build up on pistons and rings and the rings stick. STANOLUBE S-1 Motor Oil is specifically manufactured to eliminate the adverse deposits resulting from severe service conditions such as are imposed on Greco's equipment.

**The job STANOLUBE S-1 is doing** for Greco Contractors, Inc. by helping keep equipment moving earth, can also be done for you. Find out. Check with your Standard Oil automotive lubrication specialist in any of the 15 Midwest and Rocky Mountain states. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Jim Phelps, Standard Oil automotive lube specialist joins Tom Farrell in assisting Greco men with lube problems. Jim has 29 years experience with Standard—aviation as well as automotive. Here Jim discusses maintenance with Greco equipment foreman Tony Guerino.

Mack and White trucks, both gasoline and diesel, comprise the largest portion of Greco's dirt hauling fleet. Sonny Caravello (left) and Standard's Tom Farrell here talk over lube matters beside A-55 Mack Diesel.

### *Quick Facts About* STANOLUBE S-1 Motor Oil

1. Special heavy duty oil developed to meet unusually severe engine operating conditions.
2. Provides effective lubrication for automotive diesel engines even when using high sulfur fuels.
3. Manufactured from high quality "center cut" base stock.
4. Detergent-dispersant additives control deposits on pistons and rings.
5. Oxidation and bearing corrosion inhibitor additives prevent formation of excessive varnish and sludge; prevent corrosion of bearing metals.

**STANDARD OIL COMPANY**
(Indiana)

STANDARD

# Noble-Mobile batching plant on wheels

**gets job 21 miles from base and makes it pay...batches at job site with Noble-Mobile**

*Noble-Mobile at site of new Crown-Zellerbach plant, Antioch, Calif. 10" wheels dismounted for use on truck mixers. Supplier: H.W. "Heine" Gentry Co., Walnut Creek, Calif.*

Hauled along highway like semi-trailer • Set up in one day—no field wiring, footings or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized ...batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending

**NOBLE BATCHING PLANTS**

Portable, semi-portable or stationary plants designed and built by Noble Company · 1860 · 7th St., Oakland 20, Calif. TEmplebar 2-5785

Other Noble Company offices: 20950 Center Ridge Road, Cleveland 16, Ohio. EDison 1-3426.
518 First Ave. North, Seattle, Wash. MUtual 4878 · 117½ W. Manchester, Inglewood, Calif. ORegon 8-4457.

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# Advertisers in this Issue

Number of copies of this issue printed 43,640


A

Aeroquip Corp. ..... 150
Allis-Chalmers (Construction Machy. Div.) ..... 16, 17, 32, 127, 188, 189, 196
Allison Div., General Motors ..... 230, 231
American Bridge Div., U. S. Steel Corp. ..... 154
American Hoist & Derrick Co. ..... 48, 49
(Crosby Products Div.) ..... 218
American Road Equipment Co. ..... 258
American Tractor Equipment Corp. ..... 232
Armco Drainage & Metal Pdts., Inc. ..... 80
Athey Products Corp. ..... 44, 45
Atlas Powder Co. ..... 245
Austin-Western Works (Construction Equip. Div. Baldwin-Lima-Hamilton Corp.) ..... 215
Avco Mfg. Corp (Lycoming Div.) ..... 211

B

Baker-Roos, Inc. ..... 120
Baldwin-Lima-Hamilton (Construction Equipment Div.) ..... 263
Barber-Greene Co. ..... 23
Bay City Shovels, Inc. ..... 178
Beaver Pipe Tools, Inc. ..... 232
Berger & Sons, Inc., C. L. ..... 186
Bethlehem Steel Co. ..... 134, 234, 255
Black & Decker Mfg. Co. ..... 112, 113
Blackhawk Mfg. Co. ..... 133
Blaw-Knox Co. (Construction Equipment Div.) ..... 86, 87
Borne, Scrymser Co. ..... 115
Boston Woven Hose & Rubber Co. ..... 76, 77
Broderick & Bascom Rope Co. ..... 2nd Cover
Bros Boiler & Mfg. Co., Wm. (Road Machinery Div.) ..... 200
Bruning Co, Inc., Charles ..... 151
Bucyrus-Erie Co. ..... 246
Buffalo-Springfield Roller Co. ..... 182
Butler Bin Co. ..... 212

C

C & D Division, Yuba Mfg. Co. ..... 6
Caterpillar Tractor Co. ..... 21, 25, 67, 70, 71, 75, 79
Chevrolet Motors Div., General Motors ..... 18, 19
Chisholm Moore Hoist Div., Columbus McKinnon Chain Corp. ..... 239
Chrysler Corp. (Ind. Engine Div.) 3rd Cover
Cities Service Oil Co. ..... 219
Clark Equipment Co. (Automotive Div.) ..... 85, 193
(Construction Machy. Div.) 168, 169, 170, 171
Cleveland Trencher Co., The ..... 28
Clipper Mfg. Co. ..... 29, 181
Construction Machinery Co. ..... 244
Continental Motors Corp. ..... 223


*(Continued on page 262)*

Scientists, too—by the modern world we live in. Don't let your youngsters miss future career opportunities by hasty choices. For instance, see that they include enough math and science courses in high school so careers in engineering, science, chemistry and other professions will remain open to them.

**Write for the *free* folder "After High School What?" c/o Box 40, Mid-Town Station, New York 18, N.Y.**

*Published as a public service in cooperation with The Advertising Council*

# Why 70% of S. J. Groves' trailers are LaCrosse

When successful contractors like S. J. Groves & Sons Co., Minneapolis —who handle jobs all over the world —show a decided preference for *one particular low-bed trailer*, you know it must have definite advantages over other makes.

**Dave Armstrong, Equip. Supt. for Groves, explains:**

"We now own 7 heavy-duty trailers, 2 of which are specially built to haul specific pieces of equipment. The other 5 trailers are 24 and 27-ton capacity LaCrosse units, which have proven their worth, due to their *ruggedness and dependability*. Because of our wide-spread operations, we must have trailers that are ready to go *anytime — anywhere*. LaCrosse trailers do that job."

**Engineered Quality**

There are, of course, many reasons for dependable year-in and year-out performance of LaCrosse low-beds. For example, LaCrosse's *patented frame design*, with rugged ONE-PIECE main beams, gives you a much stronger understructure, with up to *1 ton less deadweight* than other low-beds. LaCrosse also gives you sturdier specially-built axles and walking beams . . . bigger, safer brakes with longer-lasting linings . . . cast steel spoke wheels with individual rim lugs . . . and a host of other exclusive quality features.

In addition, all LaCrosse trailer frames are shot-blasted and specially "weatherized" for extra long life. Tough oak platforms are specially fitted with Sealtite bolts to provide a smooth durable surface. Decks are also recessed into trailer frames to give minimum height for loading.

**Proved on the Job**

Many LaCrosse trailers, *up to 20 years old*, are still going strong, after thousands of miles of unfailing service. So before you buy any heavy-duty trailer, it will pay you to get complete facts on LaCrosse—the low-bed preferred by leading commercial haulers. Capacities range from 6 to 75 tons, with flat, drop or tilting platforms, tailored to your specific needs. Write today. LaCrosse Trailer Corp., LaCrosse, Wis.

LC-39

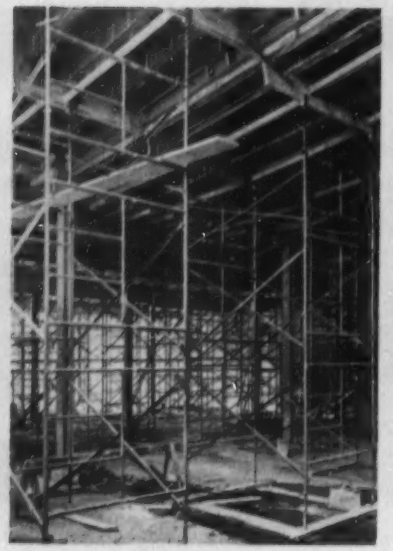
91 YRS. metal fabricating experience

*"Better Living Through Better Roads"*

LaCROSSE

VALUE LEADER IN LOW-BED TRAILERS

# HOW WACO HELPED SOLVE A ROUGH FOOTING PROBLEM... AND CUT SHORING COSTS



**THE JOB** . . . to build a sloping roof, from 20′ to 15′, over the new plaza area adjoining Omaha's Burlington Railroad Station.

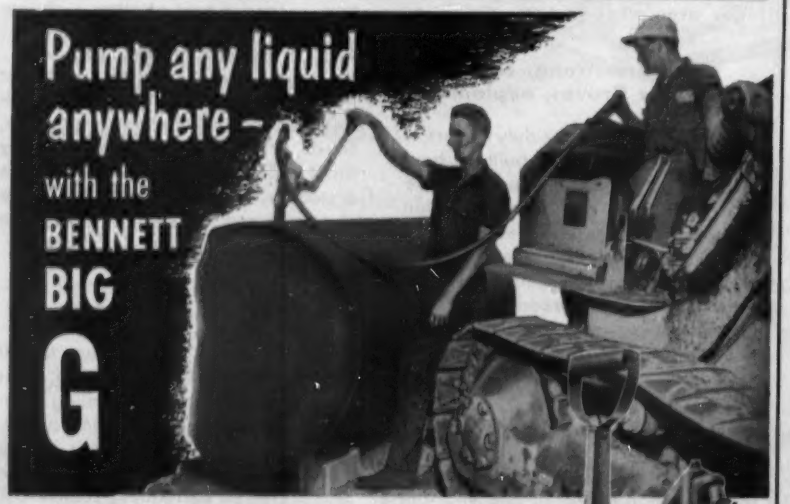
**THE PROBLEM** . . . to get sure footing on the ungraded, water-soaked clay ground under the plaza.

**THE SOLUTION** . . . heavy sills were installed under the WACO Scaffolding, to give ample footing. Adjustment screws at top and bottom of the scaffolding allowed contractors to adjust for slope and terrain quickly, easily and positively.

Are *you* looking for ways to cut shoring costs and installation time? Looking for extra ways to use your scaffolding for extra profit?

*Consult your local* WACO *dealer or write—*

**WACO MANUFACTURING COMPANY**
3561 Wooddale Avenue South, Minneapolis 16, Minnesota




Even on the most out-of-the-way projects, liquids handling is no problem with the Bennett BIG G transfer pump. Its aluminum pistons, with automotive type rings, do away with expander springs, leathers, diaphragms and other trouble-causing construction details. Because every stroke is a suction stroke, the BIG G delivers more gallons for less work. It's available for drum mounting or with tripod mount and suction hose intake—transfers up to 20 gallons per minute (based on 100 strokes) over lifts up to 20 feet. Special models available for hard to handle liquids. Ask your John Wood Representative for details, or write:

**JOHN WOOD COMPANY**
BENNETT PUMP DIVISION Muskegon, Michigan
*In Canada:* Toronto • Montreal • Winnipeg • Vancouver


## Advertisers Index

*(Continued from page 261)*


D

D-A Lubricant Co., Inc. 213
Deere & Co., John 225
Dixon Valve & Coupling Co. 265
DuPont deNemours & Co., Inc.
(Textile Fibers Dept.-Nylon Tire Cord) 47

E

Eaton Mfg. Co. (Axle Div.) 184
Economy Forms Corp. 253
Eimco Corp., The 95
Ellis Mfg. Co., Inc. 235
Euclid Div., General Motors 176, 177

F

Feiker Mfg. Co. 229
Firestone Tire & Rubber Co. 252
Flaco Corp. 12
Flexible Road Joint Machine Co., The 38, 39
Foster Co., L. B. 4
Fuller Mfg. Co. (Transmission Div.) 157

G

Gar-Wood Industries, Inc.
(Findlay Division) 92, 93, 122, 267
Gardner-Denver Co. 30, 31
Garrett Corp., The
(AiResearch Industrial Div.) 249
Gates Rubber Co. 116
General Electric Co. 185
GMC Truck & Coach Div.,
General Motors 206
General Tire & Rubber Co., The 98
Goodall Rubber Co. 22
Goodrich Co., B. F.
(Tire & Equipment Div.) 1
(Industrial Pdts. Div.) 36
Gorman-Rupp Co. 5
Greenlee Tool Co. 248
Griffin Wellpoint Corp. 239

H

Harbor Plywood Corp. 10, 11
Hardin Associates, Inc., E. L. 27
Harnischfeger Corp.
(P&H Diesel Eng. Div.) 135
Hartford Fire Insurance Co.
Hartford Accident & Indemnity Co. 257
Heede, Inc., B. M. 142
Homelite Div., Textron
American, Inc. 124, 125
Hough Co., The Frank G 153
Hyatt Bearings Div.,
General Motors 107

I

Ingersoll Rand Co. 82
Insley Mfg. Co. 237
International Harvester Co., Inc.
(Drott Div.) 161
(Industrial Power Div.) 162, 163, 164, 165

J

Jackson Vibrators, Inc.
(Electric Tamper & Equip. Co.) 236
Jaeger Machine Co., The 35
Joy Mfg. Co. 13

K

Kelley Machine Div.,
Wiesner-Rapp Co., Inc. 183
Kern Instruments, Inc. 248
Koehring Co. 130, 131

L

Laclede Steel Co. 146
LaCrosse Trailer Corp. 261
Lehigh Portland Cement Co. 222
LeRoi Division,
Westinghouse Air Brake Co. 251
Leschen Wire Rope Div.,
H. K. Porter Co., Inc. 40
LeTourneau-Westinghouse
Co. 138, 139, 140, 141, 143, 145
Lincoln Electric Co. 241
Link-Belt Speeder Corp. 86

M

Mack Motor Truck Corp. 136
Macwhyte Co. 3
Madesco Tackle Block Co. 258
Mall Tool Co. 180
Malsbary Mfg. Co. 242
Manitowoc Engineering Corp. 228
Master Vibrator Co. 152
McCarter Iron Works, Inc. 202
McGraw-Hill Book Co. 198
Miller Tilt-Top Trailer Co. 224
Morestrench Corp. 85
Motorola Communications &
Electronics, Inc. 149


*(Continued on page 265)*

**PROOF OF LIMA QUALITY**

William Wortman's four quality built Limas gang up to rush completion of the closure on a retaining dike . . . for a large storage reservoir near Stuttgart, Ark.

# "Our four rugged LIMAS hit paydirt on *all* our digging jobs . . . tough or easy!"

*says William Wortman, Stuttgart, Arkansas Contractor*

"Our four rugged LIMAS hit paydirt on *all* our digging jobs . . . tough or easy!" So says William Wortman, drainage and levee contractor of Stuttgart, Arkansas. He has three Type 34's and a Type 44—all draglines—handling his heaviest digging jobs. One machine is 22 years old and still going strong . . . keeping pace, bucket for bucket, with the newer draglines.

Bill Wortman goes on to say: "These ruggedly built LIMAS stay on the job hour after hour, day after day, year in and year out. They handle the toughest jobs with ease, and without costly breakdowns. You can't help but make money when you have a hard-working, durable machine like LIMA . . . and a good distributor to service it."

*You, too,* will hit paydirt when you depend on LIMA, designed and built with the emphasis on quality . . . to give you top performance on the toughest jobs, at low operating cost, without expensive maintenance and repair.

## COMPARE QUALITY!

*No other machine gives you as much as LIMA!*

1. Piston ring type dirt seal rings and retainers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation.
4. Anti-friction bearings.
5. Big capacity drums and sheaves.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (optional).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts.

COMPARE and you'll specify crawler, truck or wheel mounted LIMAS for *your* every construction equipment need. Get the full story today from your nearby LIMA distributor . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

BALDWIN BLH LIMA-HAMILTON

**LIMA** SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

**BALDWIN-LIMA-HAMILTON**

*Construction Equipment Division · LIMA · OHIO · U. S. A.*

# Who's handling public relations for you behind the Iron Curtain?

**It's not an easy assignment—or the kind you'll find many people volunteering for.**

But there *is* an important "public relations" job to be done behind the Iron Curtain—for you . . . for America . . . for the whole concept of freedom, free enterprise and individual rights. This job is an opportunity and a challenge as well as a serious responsibility for American business. Fortunately, with your help, there *is* an agency that can do the job—*Crusade for Freedom*, which supports Radio Free Europe and Free Europe Press.

Both these powerful, privately operated organizations continually challenge the barrage of Communist misstatements and false truths. Using saturation radio broadcasts and mass newspaper drops from message balloons, Radio Free Europe and Free Europe Press are constantly on the offensive against the Red campaign to annihilate right, reason and national pride.

Continued and heated Communist protests testify to the tremendous effectiveness of Radio Free Europe and Free Europe Press. Support freely given by free American business and private citizens will increase this effectiveness and the scope of their operations. A contribution now is perhaps the best investment you can make towards a peaceful, prosperous world.

**Give generously. It's your future!**

**Check list for business executives in the Crusade for Freedom**

- ☐ Order display material for your company bulletin board.
- ☐ Plan a paycheck stuffer to fully acquaint your employees with the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with *your Truth Dollars.*

For campaign material and information write **CRUSADE FOR FREEDOM,** 345 East 46th St., N. Y. C. 17.

# Advertisers Index

(Continued from page 262)


N

Naylor Pipe Co. ..... 132
Noble Co. ..... 260
Northwest Engineering Co. ..... 9

O

Owen Bucket Co., The ..... 226

P

Patent Scaffolding Co., Inc. ..... 26
Pitman Mfg. Co. ..... 121
Porter, Inc., H. K. ..... 144
Prime-Mover Co., The ..... 174
Pure Oil Co., The ..... 33, 34
Purolator Products, Inc. ..... 238

Q

"Quick-Way" Truck Shovel Co. ..... 118, 119

R

Raybestos-Manhattan, Inc.
(Manhattan Rubber Div.) ..... 68
Richmond Screw Anchor Co., Inc. ..... 213
Rodgers Hydraulic, Inc. ..... 243

S

Seaman-Andwall Corp. ..... 204, 205
Sheppard Co., Inc., R. H. ..... 253
Sherman Products, Inc. ..... 158
Sinclair Refining Co. ..... 111
Skil Corp. ..... 169
Skookum Co., Inc., The ..... 198
Smith & Co., D. B. ..... 198
Smith Co., The T. L. ..... 192
Snap-on Tools Corp. ..... 250
Standard Dry Wall Products, Inc. ..... 254
Standard Oil Co. of Calif. ..... 173
Standard Oil Co. (Indiana) ..... 259
Stang Corp., John W. ..... 126
Sterling Wheelbarrow Co. ..... 235
Stow Mfg. Co. ..... 208, 209
Superior Concrete Accessories, Inc. ..... 227
Symons Clamp & Mfg. Co. ..... 2

T

Terry Steel Contractors, Inc. ..... 137
Texas Co., The ..... 14, 15, 199
Thermoid Co. ..... 155
Thew Shovel Co., The ..... 43
Thurman Machine Co. ..... 156
Timken-Detroit Axle Div.,
Rockwell Spring & Axle Co. ..... 128, 129
Timken Roller Bearing Co. ..... 4th Cover
Twin Disc Clutch Co.
(Hydraulic Div.) ..... 74

U

Union Oil Co. of Calif. ..... 91
Union Wire Rope Corp. ..... 220, 221
Unit Crane & Shovel Corp. ..... 20
United States Rubber Co.
(Mechanical Goods Div.) ..... 100
Universal Atlas Cement Co. ..... 203
Universal Engrg. Corp. ..... 123
Universal Form Clamp Co. ..... 256
Universal Mfg. Corp. ..... 187


(Continued on page 266)


## CAREERS THROUGH MATH and SCIENCE

Parents . . . do you want to help your children choose their careers wisely? Then encourage them to take enough math and science in high school to qualify for *any* college courses.

Most professions now require training in these subjects. To work toward a career as an engineer or scientist a good preparation in math and science is essential.

***Remember—America needs engineers now and will for years to come.***

**Write for the free folder "After High School What?" c/o Box 40, Mid-Town Station, New York 18, N.Y.**

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For compressors, all types of air tools, water, oil and spray service, in field or factory. Will reduce operating costs on every job requiring quick connections. Locking heads are identical for all sizes of hose or threaded ends within the "Air King" size range, and are locked by simply pressing together and applying a quarter turn. Equipped with an efficient patented locking device. Made in Hose Ends, and Male and Female I. P. T. ends, in bronze and rustproofed malleable iron. Sizes up to 1".

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Twin heavy duty, general purpose Cableways, each designed to handle a normal hook load of 22,000 lb. (9.8 tons) at speeds specified hereunder:—

**SPEEDS**
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At 930 ft. from the Head Tower, with a lowering distance of 250 ft., each Cableway should be capable of placing 50 cub. yd. of concrete per hour with a four cub. yd. bucket.

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*that other readers can use—*
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## Advertisers Index

*(Continued from page 265)*


V

Vermeer Mfg. Co. ..... 214
Viber Co. ..... 210

W

Waco Mfg. Co. ..... 262
Wagner Iron Works, Inc. ..... 103
Warner & Swasey Co.
(Gradall Div.) ..... 50
White Co., David ..... 148
White Mfg. Co. ..... 214
Whiteman Mfg. Co. ..... 147
Wickwire Spencer Steel Div.,
Colorado Fuel & Iron Corp. ..... 99
Willson Products, Inc. ..... 247
Willys Motors, Inc. ..... 102
Wisconsin Motor Corp. ..... 240
Wood Co., John
(Bennett Pump Div.) ..... 262


■

CLASSIFIED ADVERTISING

Frank J. Eberle, Business Mgr.


Employment Opportunities ..... 266
Educational ..... 266
Equipment
(Used or Surplus New)
For Sale ..... 266



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# "Most versatile units we've ever used!"

**says Roland L. Bowen, A. Bentley & Sons, Toledo, Ohio**

Four Gar Wood "75" excavators, two on crawlers and two on truck chassis, handle a wide range of applications more profitably for this leading contractor. Roland Bowen, master mechanic for the firm, says, "We've worked our 75's on bridges, tunnels, caissons, powerhouse and factories—and we've found them the most versatile, most satisfactory units we've ever used. Equipped with the foundation borer attachment, our 75's are used to drill for caissons . . . with the dragline to excavate for drainage. And, they're easily converted for steel erection."

Servicing is simple, too. "No special tools or presses are required," reports Bowen. "Since all shafts are splined, we can handle occasional repairs quickly in our own shop. Our repair bills have been practically nothing!"

Gar Wood "75's" deliver this kind of low-cost, dependable workability because they're built by specialists in ¾ yard machines. Find out for yourself how this specialization can pay off in more profit on your next job. Call your Gar Wood dealer or write: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

***Gar Wood's exclusive Foundation Borer*** attachment has cut footing costs on many Bentley jobs. Machine bores a clean round hole, then bells hole at the bottom. Digs up to 26 unreinforced footings per day. Fast, positive hydraulic control. Completely convertible.

## GAR WOOD INDUSTRIES, INC.

**Wayne, Michigan • Findlay, Ohio**

Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

Gar Wood–U Pool Hoists & Scrapers | Gar Wood Winches | Gar Wood Buckeye Ditchers | Gar Wood Tractor Equipment | Gar Wood Buckeye Spreaders

# Methods Memo . . .

## Soil Stabilizer

Indiana State Highway Commission is testing a soil stabilizer that may prove a boon to road builders. It is a chemical made from tallow that imparts hydraulic stability and adds compressive strength to soils. Its trade name is Arquad 2HT.

Three test strips have been constructed in Indiana. The first is in an area where the soil has a high clay content. Chemical was added to a depth of 6 in. and the strip surfaced with 1 in. of bitumen. A control strip consists of 5 in. of stone aggregate topped by 1 in. of bitumen.

The other test strips are in an area where the soil is predominantly silt with a low degree of cohesion. The first was treated with Arquad to a depth of 6 in.; the other, to a depth of 3 in. and then topped with 2 in. of aggregate. The control strip is 1 in. of bitumen laid on raw soil.

Application of Arquad is simple. You merely add it to the compaction water in a standard distributor equipped with spray bars. Then pulverize the soil and spray at a rate of one part of Arquad to 1,000 parts of the dry weight of the soil. After spraying, repulverize the treated soil in place to insure uniform distribution of the additive.

Arquad was developed by Union Starch and Refining Co. in cooperation with Armour and Co. Materials cost of an Arquad subgrade is estimated at about 20% of the cost of an aggregate base.

## To Boost Productivity

"Some projects," the man said, "are more like convalescent homes than construction jobs."

"Some foremen," he added, "are fearful of offending workers by reprimanding them for loafing. But workers can't expect to maintain a $3.20 hourly scale without giving good work for it."

The man we quote is Andrew Harvey, president of Kansas City electrical workers local 124. He not only is concerned about low productivity in the construction industry—he also is doing something about it.

Harvey persuaded the University of Kansas to set up a course in loafing. The course will teach the bad effects of loafing and ways to prevent it.

About 50 union members are enrolled. Students include some foremen, but most are journeymen. Local 124 pays the tuition.

## New Use For Pipe

A sewer pipe saved the life of a quick-witted laborer in Kingston, N.Y.

Eugene Berardi was digging in a trench 10 ft. deep on a main street of the town when the trench walls above him caved in. Before he was completely pinned down by the falling earth, he managed to get his head into the open end of a sewer pipe. He was buried alive for 15 minutes, but, when other workers dug him out, he was not injured. He went back to work.

## Hidden Costs

Here's some advice on bidding from a certified public accountant, Sidney B. Smith of Des Moines, Ia. Watch your "hidden" costs, he says, and don't contract away your time too cheaply.

Smith told an Iowa AGC meeting that "hidden" costs include taxes, insurance, bonds, equipment repairs, and, most important of all, time. "You can decide you simply have to have some work," he said, "so you bid too low on work that is going to keep you tied up for two of the eight months you can hope to work during the year. If you sell two or three months for very little, all the other jobs you get will have to pay all the hidden costs."

## Equipment Men Talk

One way to get everybody talking instead of just listening is to seat men with common problems around small tables and let them swap ideas. That's the technique the Associated Equipment Distributors used at its Chicago convention.

Most popular topic for discussion was how to keep sales up to last year's record volume of well over $1 billion. Some said the question is not, "Will contractors buy equipment?" It is, "Whose equipment will the contractor buy?"

Competition among manufacturers — and distributors— is at a peak despite a flourishing market. Most distributors predict the emphasis this year will be on "extras"—improved service facilities, parts availability, and training facilities for contractor personnel.

And most were optimistic about sales prospects for 1956.

# high-powered pour...

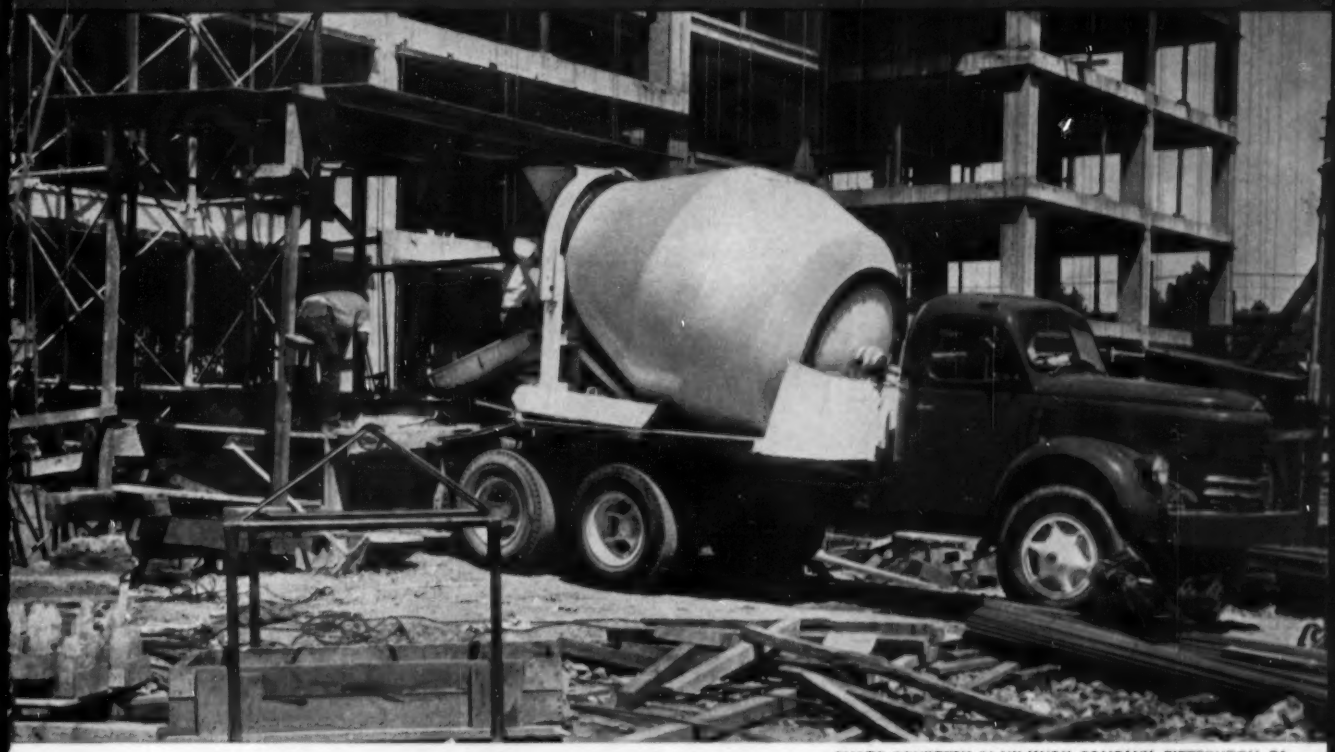


PHOTO COURTESY BLAW-KNOX COMPANY, PITTSBURGH, PA.

## *Chrysler Ind. 30 Engine powers mixer, gýrol Fluid Coupling doubles its life*

Going up . . . one apartment house, fourteen floors high, in Cleveland, Ohio. The transit mixer is a Blaw-Knox. It is powered with a Chrysler Ind. 30 – 230 cubic inch displacement engine.

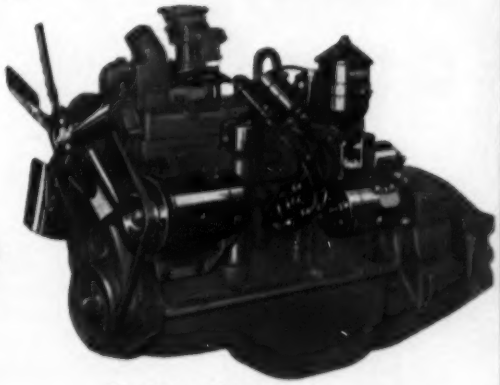
Most modern transit mixers are Chrysler-powered and equipped with Chrysler gýrol Fluid Coupling. And there is good reason for the popularity of this Chrysler combination.

In the first place, Chrysler Industrial Engines are heavy-duty, high-speed engines . . . constructed of heavy-duty components. Yet, thanks to Chrysler research in metallurgy, they are compact, lightweight engines, easily installed in modern equipment.

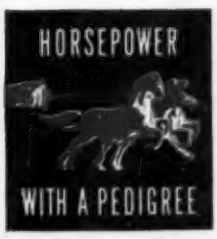
Secondly, gýrol Fluid Coupling – the other half of the Chrysler combination – absorbs the wear and tear imposed by power impulses, sudden starts and stops. The result is 100% *longer life for clutch, transmission and equipment itself.*

Finally, like other manufacturers of self-powered equipment, transit mixer manufacturers recognize the initial economy of installing Chrysler Industrial Engines. They know that Chrysler Industrial Engines are not expensive. Production-line methods adapted to specialized industrial engine building provide custom-built engines at mass-production prices.

Learn more about the advantages of Chrysler Industrial Power for your equipment. See a nearby Chrysler Industrial Engine Dealer or write direct: **Dept. 83, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.**



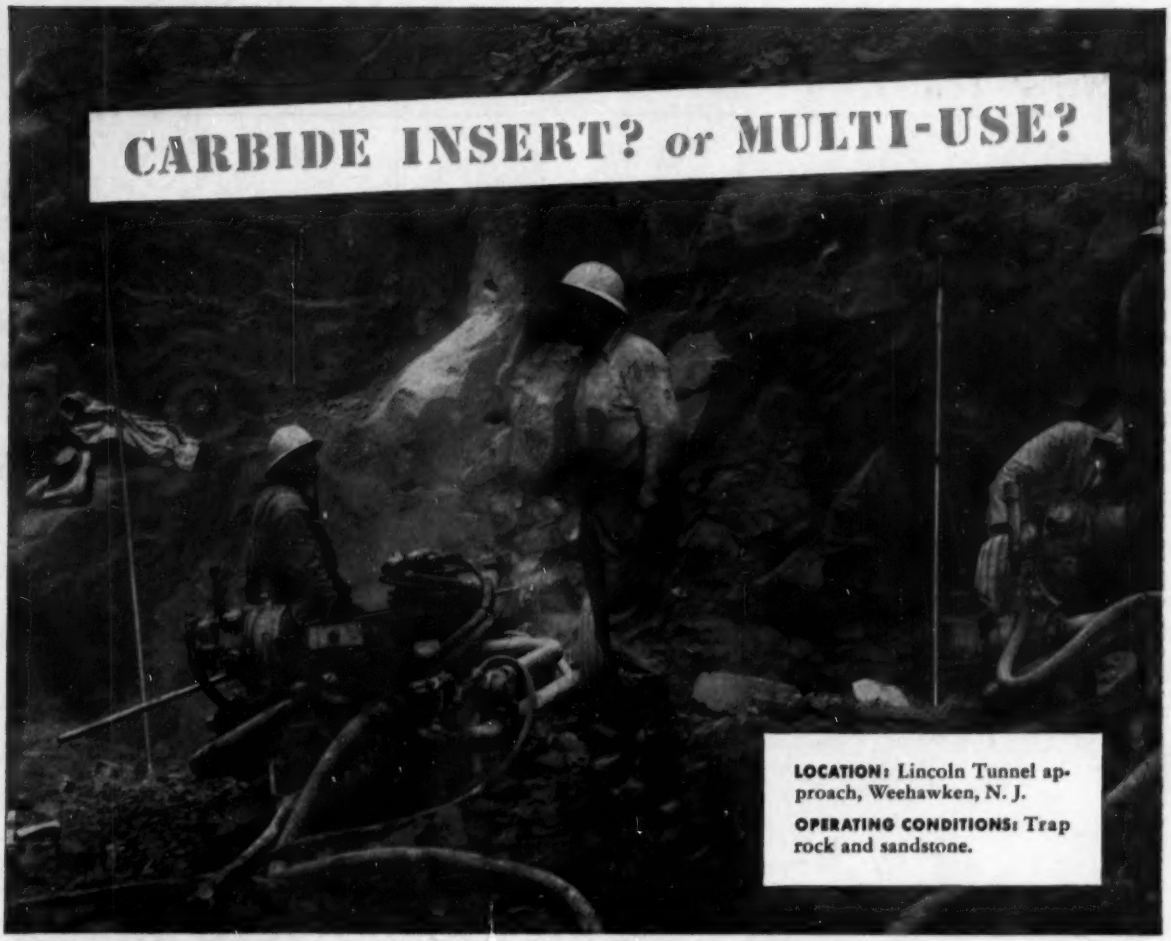
**Chrysler Ind. 30 Engine — 230 cubic inch displacement**




# Chrysler

## INDUSTRIAL ENGINES

Industrial Engine Division • Chrysler Corporation


CARBIDE INSERT? or MULTI-USE?
LOCATION: Lincoln Tunnel approach, Weehawken, N. J.
OPERATING CONDITIONS: Trap rock and sandstone.

# Grow Construction Company speeds new Lincoln Tunnel approach with TIMKEN® DC carbide insert bits

WAGON drilling through abrasive trap rock and sandstone, Grow Construction Company drilled out full increments of steel and increased drilling speeds by using Timken® DC carbide insert bits.

Timken carbide insert bits are best for hard abrasive ground. You get fast, economical drilling with fewer bit changes for constant-gauge holes, small-diameter holes, and extremely deep holes.

Timken carbide insert bits may not be best for all drilling jobs. Drilling ordinary ground, for instance, is most economical when you use Timken *multi-use* bits. With correct and controlled reconditioning, they give you the lowest cost per foot of hole when you can drill out full increments of steel.

Both carbide and multi-use Timken bits are made from Timken fine alloy steel. We're the only removable bit manufacturer that makes its own steel. We do it to control quality at every step of the way.

Timken bits save time when drilling conditions change because many of them are interchangeable in the same thread series. You can switch bits when the ground changes without need for changing drill steels, too. And both Timken carbide insert and multi-use bits have special shoulder unions that protect the threads from drilling impact.

To find out which Timken bit type is best for your needs, call or write the Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

*your best bet for the best bit ... for every job*

TIMKEN

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